PLANNING SKILLS OF STUDENTS OF VARYING ABILITY USING COMPUTER-ASSISTED INSTRUCTION

BY

MARYSE LUCBERT

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Maryse Lucbert

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Abstract

This study investigated the strategic or task-specific planning skills of students of varying abilities using intelligent computer-assisted instruction (ICAI). The sample consisted of 39 boys and girls in grades four to six attending summer programs for the gifted and non-gifted in the Greater Montreal area. They were divided into three comparison groups: a high-ability-gifted (HG) group (n=13), a high-ability-not-identified-as-gifted (HNG) group (n=11), and an average-ability (A) group (n=15). Each student created three adventure plans with an ICAI called SCARABEE (Système de Conception Assistée de Récits d'Aventure dans le But d'Enseigner l'Ecriture) for three, thirty-minute sessions over an observation period of two weeks. Results of this research demonstrate no statistically significant differences among ability groups (HG, HNG, and A) on the two levels of strategic planning skills. The level of ability may not be the determining variable in explaining good problem solving since higher levels of strategic planning could also involve other variables which remain to be investigated.

Résumé

Cette recherche étudie les techniques de planification stratégique chez des enfants d'habilité moyenne ou supérieure utilisant un logiciel d'enseignement intelligent assisté par ordinateur (EIAO). Trente-neuf garçons et filles du deuxième cycle du primaire (4e à 6e année) inscrits dans des programmes d'été de la région du Grand Montréal, ont été choisis et répartis en trois groupes: le premier, d'habileté-supérieure-identifiés-doués (n=13); le deuxième, d'habileté-supérieure-non-identifiés-doués (n=11); et le troisième, d'habilité- moyenne (n=15). Chaque élève a conçu trois scénarios d'aventure à l'aide de SCARABEE (Système de Conception Assistée de Récits d'Aventure dans le But d'Enseigner l'Ecriture) pendant trois sessions de trente minutes pour une durée d'observation de deux semaines. Les résultats indiquent que les trois groupes de sujets ne diffèrent pas de façon significative sur les deux niveaux de techniques de planification stratégique. Ces données suggèrent que le niveau d'habileté ne serait pas une variable déterminante dans la résolution de problème puisque le niveau avancé de techniques de planification stratégique impliquerait d'autres variables qu'il reste à explorer.

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[1]Please note that the content of Appendix A has been taken directly from Coulombe, C., Decary, M., & Young, R. (1988b). English SCARABEE [Computer program manual, English version]. Montreal, Quebec, Canada: Les Logiciels Maquina Sapiens Inc. For further information, contact: Les Logiciels Maquina Sapiens Inc., 5780 Decelles, Montreal, (514)733-1095.

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CHAPTER 1

Introduction

There has been a growing concern for stimulating the higher order thinking skills of high ability (HA) and, talented and gifted (TAG) students, using computer-assisted instruction (CAI). Some authors have suggested that CAI might be challenging environments to develop higher order thinking skills (Derevensky & Cartwright, 1977; Dover, 1983; Ford, Walkington & Bitter, 1982; Grover, 1987; Mandinach, 1987; Parker & Johnson Parker, 1985; Schnider, 1987; and Trifiletti, 1985).

As Shore (1986) mentioned, gifted children "need to explore real or hypothetical problems (...) to which the answer is not necessarily known, and in a way adult problem creators and solvers with similar interests might pursue (p. 4)".

Within this concern, planning skills have been considered as a critical element of superior ability especially with cognitively demanding software. The goal of this study is to investigate the strategic planning skills of students of varying ability involved with a CAI called SCARABEE (Coulombe, Decary, & Young, 1987; 1988).

Giftedness and High Ability

Definitions of giftedness range from overinclusiveness where most are considered gifted, to overexclusiveness, i.e. a minority of people with an IQ of 140+ are classed as gifted.

According to the U.S. Public Law No. 94-192 (Office of Education, 1972), talented and gifted (TAG) students need special programs and they are considered as a special population if they distinguish themselves in at least one of these areas of talent: (a) general intellectual ability, (b) creativity and divergent thinking, (c) specific academic aptitude, (d) visual and performing arts, (e) leadership, or (f) psychomotor ability.

In constrast, Renzulli (1978) maintains that giftedness is the combination of three traits: a high creativity, a high task committment and an above-average ability.

Subjects in the present study were divided into three groups according to the above cited definitions: the average-ability (not identified as gifted), the high-ability-identified-as-gifted, and the high-ability-not-identified-as-gifted.

Planning Skills

Several types of planning skills have been identified but the majority of them fall into two categories: general planning (macroplans related to cognitive styles), and strategic or task-specific planning. According to Kirby (1984), planning skills dealt with "some aspects of intelligence (...) and should facilitate an information processing analysis of what intelligence is" (p. 85). Kirby (1984) also mentioned that task-specific plans were often automatized, i.e. they tended to be more practiced and better coordinated than macroplans which were more generalized.

In this study, the two levels of strategic planning studied, wer defined by Greeno (1978) as "the ability to set goals, choose appropriate action plans and in general, organize cognitive activity so as to produce a solution to a problem" (p. 72). Low level planning refers to the acquisition of skills whereas high level planning represents higher order cognitive structures or transfer of the skills acquired in the low level. Modification was defined here as the ability to select and modify the objects' properties in the ICAI. Pertinence can be defined as the aptitude to make pertinent or goal-relevant choices and modifications of these objects (see Appendix D).

Computer Environment

CAI has been defined as frame-oriented or non-frame oriented computer environments in which "frames are prestored units of knowledge" (Wenger, 1987). Merrill, Tolman, Christensen, Hammons, Vincent, & Reynolds (1986) have identified four types of CAI: drill & practice, tutorial, simulation, and games.

McClellan (1985), Trifiletti (1985), and Shore (1986) have mentioned that games and simulations are suited for gifted because they are free environments of play, problem solving, and scientific simulations which foster independent learning, creativity, decision making, higher order thinking, and metacognition.

SCARABEE (Système de Conception Assistée de Récits d'Aventure dans le But d'Enseigner l'Ecriture) is the software used in this study (see Appendices C and D). It is classed as intelligent CAI (ICAI) since it combines a game, a simulation, and a tutorial with some features of artificial intelligence: an object-oriented microworld and a natural language interface. The objects in SCARABEE's microworld Jungle are representations of real objects (Coulombe, Decary, & Young, 1988c).

CHAPTER 2

Review of the Literature

The literature on the uses of computers with TAG students has dealt primarily with programming, mathematics and testing (Dover, 1983; Kanevsky, 1985; McClellan, 1985; and Shore, 1986). Although useful in designing curricula, this body of research does not satisfactorily address at the issue of most appropriate computer uses for TAG students. The following studies address the issue of planning skills of students of varying ability via CAI and are grouped under three headings: giftedness and planning skills, levels of planning skills, and computer programs or interaction.

Giftedness and Planning Skills

Mandinach (1987) examined the relationship between ability levels of students and their strategic planning in an intellectual computer problem-solving game. A median split on overall fluency and analytic reasoning scores was used to assign subjects to low and high ability groups. This was broader than the usual grouping of gifted and nongifted students but was thought to be acceptable. The task, Wumpus, was learned under two forms of teaching.

In Mandinach's (1987) research, the first form of teaching, called instruction, was explicit and activated skills or existing cognitive structures. The other form of teaching, gaming, was implicit and involved application of skills (transfer). The measures included verbal and computer responses of students and latencies. High ability students performed better on transfer tasks induced from gaming (indirect teaching). However, since random assignment and randomization of subjects were not performed, the generalizability of the results could be questioned.

Levels of Planning Skills

Grover (1987) explored differences in computer performance between gifted and nongifted students related to levels of task-specific planning skills in an electrical circuitry simulation, Rocky's Boots (Robinetts, 1982). The 29 students in the gifted group were identified by school based on teacher's ratings, on students' achievement tests, and on standardized tests with IQ scores of 120 and higher. The 14 students in the average group scored below 120 and below the 90th percentile on the same tests. Students worked one hour twice a week with Rocky's Boots. The level of planning skills accounted for 62% of the variance explained (ANOVA stepwise regression) in computer competency.

In Grover's (1987) study, only the high planning group (a majority of gifted) mastered high order problems (levels 3 and 4) requiring more complex planning as opposed to levels 1 and 2 which were simpler in logic. The implication of this research is that giftedness was not the main factor causing good problem solving; the determining factor was the students' level of planning skills (high or low).

Computer interaction and Programs

Parker and Johnson Parker (1985) exposed gifted students to an acceleration program in mathematics and basic research skills in a computer environment for two one-hour-and-fifteen minute periods per week from September to May. The sample consisted of thirty students designated as gifted by their school. The pretest and posttest taped higher order skills in the Olympics of the Mind (OM) program. Two kinds of verbal problems were given, requiring two kinds of judgments: common and creative. Software from the Minnesota Educational Computing Consortium (MECC) and the Learning Company (LC) ranged from basic to complex thinking. The increase in the gifted's scores between pretest and posttest may have been due to computer interaction. The results should be considered carefully because this study was primarily an evaluation.

Ford, Walkington, and Bitter (1982) investigated the higher level thinking skills of twenty-six 5th to 8th graders identified as gifted who attended an enrichment/acceleration computer program for a period of five weeks. The program was set up by the Temple Parent Gifted Association Arizona (TPG) and took place at a local Arizona high school where six terminals were connected by telephone to a host computer at Temple University. Significant differences were observed between students' pretest and posttest scores on the Minnesota Computer Literacy and Awareness Assessment (MCLAA) which tapped higher order thinking skills. The students' improvement of their higher order thinking skills was found to be due to the TPG enrichment/ acceleration curriculum.

Summary

The issues raised in the above studies should be further investigated and their results are summarized here. In most of the studies, average ability students benefited more from explicit instruction in computer environments and developed basic skills or lower levels of planning (simpler in logic). Most of the gifted or high ability children learned more from indirect teaching and mastered higher levels of strategic planning requiring more complex planning or transfer of skills.

However, some authors such as Grover (1987) found that giftedness was not the only factor accounting for good problem solving; the determinant factor was the level of planning skills (high and low). Ford et al. (1982), and Parker & Johnson Parker (1985) mentioned that the increase in the gifted's planning skills may also have been due to computer interaction or to the type of program in which they were.

CHAPTER 3

Research Design

Problem Statement

This study was designed to examine the strategic planning skills of students of varying ability (A, HG, and HNG) using SCARABEE, a CAI adventure game.

Subjects were asked to set their own goals and to perform strategic planning: to choose, to select, and to check properties in each category of elements in SCARABEE's microworld (places or locations, amount of light at locations, description of locations, hero, objects, characters, and animals) for them to be goal-relevant (see Appendix D). Scores on two levels of strategic planning were obtained: a low level score (modification) and a high level score (pertinence) (see Evaluation Grid, Appendix D). The questions addressed in the present study are summarized below.

1. Do students of varying abilities differ on the low level strategic planning skills (modification)?
2. Do students of varying abilities differ on the high level strategic planning skills (pertinence)?

3. Do students vary according to grade level on low level strategic planning skills (modification)?
4. Do students vary according to grade level on high level strategic planning skills (pertinence)?
5. Do subjects vary according to gender on their low level strategic planning skills (modification)?
6. Do subjects vary according to gender on their high level strategic planning skills (pertinence)?
7. Do children differ according to language on low level strategic planning skills (modification)?
8. Do children differ according to language on high level strategic planning skills (pertinence)?

Levels of Planning Skills and Ability

Grover (1987), and Mandinach (1987) held that average children develop lower levels of planning (simpler in logic) and gifted or high ability children acquired higher levels of planning activating more complex cognitive structures or transfer of skills.

Hypothesis 1:

The means of low level strategic planning (modification) scores do not differ significantly among the three groups (A, HG, HNG).

Hypothesis 2:

The means of high level strategic planning (pertinence) scores differ significantly among the three groups (A, HG, HNG).

Levels of Planning Skills and Other Factors

Since Grover (1987) found that the level of planning skills was the most determinant factor accounting for good problem solving in CAI; it would be interesting to see if other variables (grade level, gender, and language) are also be related to planning.

Hypothesis 3:

The means of low level strategic planning (modification) scores do not differ significantly among the three groups (A, HG, HNG) according to grade level.

Hypothesis 4:

The means of high level strategic planning (pertinence) scores differ significantly among the three groups (A, HG, HNG) according to grade level.

Hypothesis 5:

The means of low level strategic planning (modification) scores do not differ significantly among the three groups (A, HG, HNG) according to gender.

Hypothesis 6:

The means of high level strategic planning (pertinence) scores differ significantly among the three groups (A, HG, HNG) according to gender.

Hypothesis 7:

The means of low level strategic planning (modification) scores do not differ significantly among the three groups (A, HG, HNG) according to language.

Hypothesis 8:

The means of high level strategic planning (pertinence) scores do not differ significantly among the three groups (A, HG, HNG) according to language.

Method

This study involved a causal-comparative design since it explores possible causal relationships by comparing students of varying ability on two levels of strategic planning skills (modification and pertinence). Random assignment to treatment was not possible and there was no experimental treatment.

Subjects

Thirty-nine subjects were chosen from lists of participants in English and French summer schools or sport and leisure programs for gifted or for average children in the Greater Montreal area. They were 18 male and 17 female students. Thirteen of them spoke English as a mother tongue and 22 were French. Four subjects were excluded from the analyses since they did not complete all three plans (due to absenteism or low motivation) as were children in grades 2 and 3, and the learning disabled due to a lack of data.

Twenty-eight subjects remained in the final analyses, and they were divided into three comparison groups, the high-ability-gifted (HG), the high-ability-not-identified-as-gifted (HNG) and the average-ability (A) groups; which comprised ten, nine, and ten students respectively.

Subjects in the HG and HNG group both comprised high ability students because they were all enrolled in a summer program for the gifted on the basis of school or parent identification. The HG group were operationally defined as gifted because they attended programs for the gifted during the year whereas the HNG group did not and were labelled not-identified-as-gifted. Subjects in the A group were from a regular summer program and were not identified either as learning disabled or gifted but as average students.

Materials

The computer simulation games used were the English and French versions of an ICAI, SCARABEE (Coulombe, Decary & Young, 1987; 1988) which runs on IBM and compatibles (512K) with Color Graphics Adaptor (CGA) or Very High Density Color Graphics Adaptor (VGA) card. The first disk contained the program and the microworld environment (jungle); the second one was the exercise disk for users to save their own work.

SCARABEE has two modes, a game mode and an authoring system in which users can either play or create the game (see Appendix C). SCARABEE was chosen as the software for this study because it was designed to develop story writing (language skills) and problem solving (planning skills and logical thinking).

Procedure

Each subject worked individually with SCARABEE for three thirty-minute sessions for a period of two weeks in July and August 1990. Subjects included in the study had not used SCARABEE I or SCARABEE II before. Each subject created three adventure plans with SCARABEE which comprised the observed data (see Appendix D). The computer interaction was videotaped to allow observation of subjects' behavior after the data collection period. The data were entered in a database program created in RBASE (Sokolowski, 1990) and subsequently transferred in SPSS/PC+ for statistical analyses. Subjects were administered an informal questionnaire to gather information (age, grade level, etc.) and to ensure that subjects had similar computer experience (see Appendix B). All students had already used computers either at school or at home and though they had played with adventure games previously, they were unfamiliar with SCARABEE which was used in this study.

Demonstration

During an introduction period, the experimenter gave out letters of consent and information (see Appendix A), as well as verbal and written explanations of goals and tasks (Appendix C). A hands-on activity was done before the first computer session and was repeated for the second and third sessions. This hands-on activity consisted of showing computer operations (enter, exit, select, modify, etc.) for the authoring system interface and the menu of characteristics of items (locations, characters, and animals) using the demonstration adventure game included in the original program of SCARABEE (see Appendix C).

The Task

In the task, subjects where asked to write a goal for each adventure plan in the introductory text window and performed strategic planning in selecting, verifying, and modifying the features of SCARABEE's different items (see strategic steps below) for them to be goal-relevant. The items in SCARABEE are organized in classes which determine their characteristics and behaviors. In SCARABEE, the user must use the arrow keys to move the cursor and press return to select an item, backspace to remove an item, and escape to close a window or menu (see Appendix C).

In SCARABEE, there are menu windows with a choice of items, content windows in which objects can be placed, and text windows in which text can be written (see Appendix C).

Strategic Steps

1. What do you want to do? menu: Subjects had to choose the item create a new adventure (see Appendix C).
2. Adventure definition menu: Subjects had to select and write the title of their adventure, their name, and their goal in the title window, author window, and introductory text window; then choose the geography window (see Appendix C).
3. Geography window (location, content, characters): Subjects had to select locations in the choose among places menu and modify the features of each location (light, content, description) (see Appendix C).
4. Contents window: Subjects had to put objects in each location from the different types of objects menu: (accessories, animals, characters, containers, documents, foods, furniture, traps, treasures, vegetations, weapons) (see Appendix C).
5. Properties of an object menu: Subjects had to modify attributes of each object they had selected (see example below).

Example: the object table belongs to the class furniture and has four items in its menu: what is on top (content window), what is under (content window), size (menu window), description (text window) (see Appendix C).

Measures

The scoring of the computer adventure plans was done through observation of the videotapes and print-outs. Because students were in the creation mode (authoring system) of the game, no criterion baseline could be established a priori. The goals and number of possible elements varied from one student to another.

Two levels of strategic planning were studied: low level (modification) and high level (pertinence) for each class of items (locations, light of locations, description of locations, hero, objects, characters, and animals) in each plan.

There were three kinds of scores: (a) the total percentage of modification of elements (number of modified objects over total number of objects) (b) the total percentage of pertinence of elements (number of pertinent objects over total number of objects) and, (c) the percentage of pertinence of modified objects (number of objects pertinently modified over total of modified objects) (see Evaluation Grid in Appendix D).

CHAPTER 4

Data Treatment

Statistical Procedures

Multivariate analyses of variance (MANOVA) were used to test each hypothesis for statistically significant differences among the A group, the HG group, and the HNG group (generalized *F*-tests with $p < 0.05$) on the dependent measure; the two levels of strategic planning (modification and pertinence). As Ferguson (1989) has pointed out, the *F*-test is robust despite minor departures from normality even in small samples. Hypotheses 7 & 8 were dropped from the analyses due to a lack of sufficient data when subjects were divided into subgroups by language.

Results

Table 1 presents the results of a MANOVA for the two levels of strategic planning skills (modification and pertinence) for the A group, HG group, and HNG group.

Table 1

MANOVA Table for Strategic Planning Skills of Groups: Modification, Pertinence and Pertinent Modification

Source of variation	SS	df	MS	F	p
Strat.	9252.10	2	4626.05	297.29	.000
Group by Strat.	59.32	4	14.83	.95	.441
Within cells	778.03	50	15.56		

Note. SS = sum of squares; MS = mean of squares; F = F-ratio (F-tests); p = statistical significance of F-ratio; Strat. = all the levels of strategic planning skills (modification + pertinence + pertinent modification).
* p < .05

No statistically significant differences were found among means of the three ability groups when all levels of strategic planning skills are combined (modification, pertinence, and pertinent modification).

In Tables 2 to 10 are presented the means on low or high strategic planning skills for the A, the HG and the HNG groups.

Hypothesis 1:

The means of low level strategic planning (modification) scores do not differ significantly among groups (A, HG, HNG).

Table 2 presents the means and standard deviations of groups for low strategic planning (modification).

Table 2

Means and Standard Deviations For Low Strategic Planning: Modification

Group	M	SD	n
Average	13.18	4.46	9
High-gifted	12.93	2.90	10
High-not-identified-gifted	11.03	1.95	9
For entire sample	12.41	3.28	28

Note. Values represent mean and standard deviation for low strategic planning: total percentage of modification of items in SCARABEE (number of modified objects over total number of objects).

As expected, Hypothesis 1 was supported, because there was no statistical difference among groups on modification in the MANOVA results (F (1,25) = .28, p = .761 n. s.).

Hypothesis 2:

The means of high level strategic planning (pertinence and pertinent modification) scores differ significantly among the three groups (A, HG, HNG).

Table 3 presents the means of high strategic planning (pertinence) for all ability groups.

Table 3

Means and Standard Deviations For High Strategic Planning: Pertinence

Group	M	SD	n
Average	30.44	8.54	9
High-gifted	27.93	4.44	10
High-not-identified-gifted	30.63	6.86	9
For entire sample	29.61	6.61	28

Note. Values represent mean and standard deviation of high strategic planning: total percentage of pertinent items in SCARABEE (number of pertinent objects over total number of objects).

Table 4 presents the means of high strategic planning (pertinent modification) for all ability groups.

Table 4

Means and Standard Deviations For High Strategic Planning: Pertinent Modification

Group	M	SD	n
Average	4.78	1.43	9
High-gifted	4.90	1.88	10
High-not-identified-gifted	3.85	1.97	9
For entire sample	4.52	1.78	28

Note. Values represent mean and standard deviation for high strategic planning: total percentage of pertinent modification items in SCARABEE's plans (number of pertinently modified objects).

Contrary to what was expected, Hypothesis 2 was not supported since the groups did not differ significantly in the MANOVA results on high strategic planning: pertinence (F (2,25) = 2.16, p = .137 n. s.), and pertinent modification (F (2,25) = .69, p = .510 n.s.).

Hypothesis 3:

The means of low level strategic planning (modification) do not differ significantly by grade level among the three groups.

Table 5 presents the means of the low strategic planning (modification) for all ability groups by grade level.

Table 5

Means and Standard Deviations For Low Strategic Planning by Grade: Modification

Group	Grade Level	M	SD	n
Average	4	10.08	.50	4
	5	11.33	.00	1
	6	16.75	4.68	4
High-gifted	4	12.67	2.62	6
	5	14.56	3.34	3
	6	9.67	.00	1
High-not-identified-gifted	4	10.95	2.24	7
	5	11.33	.47	2
	6	-	-	-
For entire sample		12.41	3.28	28

Note. Values represent mean and standard deviation in each group by grade level for low strategic planning: percentage of modification in SCARABEE (number of modified objects over total number).

Hypothesis 3 was supported, as expected, since the groups did not differ significantly by grade level on modification (low strategic planning) in the MANOVA results (F (1,20) = .48, p = .625 n. s.).

Hypothesis 4:

The means of high level strategic planning (pertinence and pertinent modification) scores differ significantly among the three groups (A, HG, HNG) according to grade level.

Table 6 presents the means of the high strategic planning (pertinence) for all ability groups by grade level.

Table 6

Means and Standard Deviations For High Strategic Planning by Grade: Pertinence

Group	Grade Level	M	SD	n
Average	4	26.08	1.32	4
	5	27.33	.00	1
	6	35.58	11.35	4
High-gifted	4	26.33	4.10	6
	5	30.22	5.21	3
	6	30.67	.00	1
High-not-identified-gifted	4	30.05	7.40	7
	5	32.67	6.13	2
	6	-	-	-
For entire sample		29.61	6.61	28

Note. Values represent mean and standard deviation in each group by grade level for high strategic planning: pertinence (number of pertinent objects in SCARABEE over total number of objects).

Table 7 presents the means of the high strategic planning (pertinence) for all ability groups by grade level.

Table 7

Means and Standard Deviations For High Strategic Planning by Grade: Pertinent Modification

Group	Grade Level	M	SD	n
Average	4	4.250	1.500	4
	5	5.333	.000	1
	6	5.167	1.599	4
High-gifted	4	5.833	1.243	6
	5	2.667	1.155	3
	6	6.000	.000	1
High-not-identified-gifted	4	3.667	2.211	7
	5	4.500	.707	2
	6	-	-	-
For entire sample		4.524	1.776	28

Note. Values represent mean and standard deviation in each group by grade level for high strategic planning: percentage of pertinent modification (number of pertinently modified items in SCARABEE).

Contrary to predictions, Hypothesis 4 was not supported since the groups did not differ by grade level on the high level of strategic planning: pertinence (F (2,20) = 1.61, p = .225 n. s.), and pertinent modification (F (3,20) = 1.62, p = .217 n. s.).

Hypothesis 5:

The means of low level strategic planning (modification) scores do not differ significantly among the three groups (A, HG, HNG) according to gender.

Table 8 presents the means of the low strategic planning (modification) for all ability groups by gender.

Table 8

Means and Standard Deviations For Low Strategic Planning by Gender: Modification

Group	Gender[1]	M	SD	n
Average	Fem.	10.83	1.73	4
	Masc.	15.07	5.25	5
High-gifted	Fem.	12.07	1.85	5
	Masc.	13.80	3.69	5
High-not-identified-gifted	Fem.	11.50	1.97	4
	Masc.	10.67	2.08	5
For entire sample		12.41	3.28	28

Note. Values represent mean and standard deviation in each group by gender for low strategic planning: percentage of modification in SCARABEE (number of modified objects over total number).
[1]Fem. = feminine gender; Masc. = masculine gender.

Hypothesis 5 was supported as expected, since groups did not differ significantly by gender (MANOVA results) on modification (F (1,22) = 1.12, p = .304 n. s.).

Hypothesis 6:

The means of high level strategic planning (pertinence and pertinent modification) scores differ significantly among the three groups (A, HG, HNG) according to gender.

Table 9 presents the means of the high strategic planning (pertinence) according to gender for all ability groups.

Table 9

Means and Standard Deviations For High Strategic Planning by Gender: Pertinence

Group	Gender[1]	M	SD	n
Average	Fem.	26.00	1.155	4
	Masc.	34.00	10.448	5
High-gifted	Fem.	27.00	4.983	5
	Masc.	28.87	4.154	5
High-not-identified-gifted	Fem.	33.42	8.062	4
	Masc.	28.40	5.600	5
For entire sample		29.607	6.611	28

Note. Values represent mean and standard deviation in each group by gender for high strategic planning: pertinence (number of pertinent objects in SCARABEE over total number of objects).
[1]Fem. = feminine gender; Masc. = masculine gender.

Table 10 presents the means of the high strategic planning (pertinent modification) by gender for all ability groups.

Table 10

Means and Standard Deviations For High Strategic Planning by Gender: Pertinent Modification

Group	Gender[1]	M	SD	n
Average	Fem.	5.50	1.00	4
	Masc.	4.20	1.56	5
High-gifted	Fem.	5.60	1.59	5
	Masc.	4.20	2.05	5
High-not-identified-gifted	Fem.	3.33	2.23	4
	Masc.	4.27	1.88	5
For entire sample		4.52	1.78	28

Note. Values represent mean and standard deviation in each group by gender for high strategic planning: percentage of pertinent modification (number of pertinently modified items in SCARABEE).
[1]Fem. = feminine gender; Masc. = masculine gender.

Contrary to what was expected, Hypothesis 6 was not supported since groups did not differ significantly on high strategic planning by gender (MANOVA results) on pertinence (F (2,22)= .03, p = .98 n.s.), and on pertinent modification (F(2,22) = 2.94, p = .074 n.s.).

CHAPTER 5

Discussion

The present study investigated whether or not students of varying ability levels differed on low or high strategic planning skills while they were involved in the conception of computer-based adventure plans with SCARABEE. Students were expected to differ significantly according to their ability level, on the high level of strategic planning (pertinence and pertinent modification) but not on the low level of strategic planning (modification).

This study found no evidence of statistically significant differences among ability groups on the two levels of strategic planning skills; modification and pertinence (see Table 1).

As predicted, the A group, the HG group, and the HNG group did not differ significantly on the low level of strategic planning (modification) most likely because it represents the acquisition of simpler logic skills accessible to the average as well as the gifted or high ability children. In other words, all subjects were able to perform modification when they were involved in selecting and changing the properties of objects in the ICAI.

Grover (1987), and Mandinach (1987) maintained that the level of planning skills on a computer task were related to ability because average ability children tended to acquire lower levels of planning whereas gifted or high ability children often developed higher levels of planning. Ford et al. (1982), and Parker and Johnson Parker (1985) included only gifted students in their samples but their results support Grover (1987) and Mandinach (1987).

Results of the present research partly confirms previous findings in the literature. Contrary to what was expected, the A group do not differ significantly from the HG group and the HNG group on the high level of strategic planning (pertinence, and pertinent modification).

The HG and the HNG groups were expected to differ from the A group because high planning skills were thought to be a critical element of higher ability since they refer to cognitively demanding structures such as transfer of the skills.

Results indicate that high strategic planning seems to be accessible to students of both average and high ability since subjects do not differ significantly on pertinence, and pertinent modification and were all able to make pertinent or goal-relevant choices and modifications of objects in the ICAI's microworld.

However, despite a lack of significant differences among the three ability groups on high strategic planning, the observed trend was consistent with previous findings. The HG group was slightly higher than the A group but the HNG was not necessarily closer to the HG group than it was to the A group (see Tables 4 and 5).

There was a trend for mean scores to increase according to the grade level of students on both low and high strategic planning (see Tables 6, 7, and 8); and it is consistent with Grover's (1987) finding that students' grade level was a more important factor than giftedness or high ability in explaining good problem solving. This was thought to be because the higher levels of strategic planning involve maturation as well as ability.

The present study also investigated gender difference across ability groups. Though the results were not significant, the trend was for female students to have lower means than male students, except on pertinent modification, one kind of high strategic planning (see Tables 9, 10, and 11). This kind of relationship has not been reported in the previous literature and further research is recommended to ascertain if female students perform less well than male students on certain types of cognitive tasks.

Since Ford et al. (1982), and Parker and Johnson Parker (1985) found that there was an increase in planning skills after computer interaction, it is important to consider the effect of practice over all sessions as well as to compare the first and the last sessions.

As Calfee (1981) mentioned "Research is short sighted when it ignores the contextual effect of time, when it focuses on pretest vs. posttest" (p. 43). However, this kind of analysis was not possible in the present study since there were only three thirty-minute sessions with the ICAI and it was not enough to show variation among groups.

It would be interesting to replicate the research to verify the findings if the number of computer sessions as well as the amount of computer interaction time were increased.

In conclusion, no support could be found for the hypothesis that average ability, gifted or high ability children differ significantly on the high level strategic planning skills (pertinence and pertinent modification). The HG group and the HNG group were expected to have similar mean scores on <u>pertinence</u> because they both included high ability students, gifted or not. The means of the HG group and the HNG group were also expected both to differ from the A group, but they did not.

These results imply that the level of strategic planning skills may not necessarily be a useful criteria for distinguishing high ability from average students. The lack of significant differences may be explained by the fact that groups did not vary on strategic planning skills or that it was not possible to detect the differences because of the specific characteristics of the type of software used (SCARABEE), or because of the causal-comparative research design's limitations.

Though the results of this study cannot be generalized to all students of average ability or gifted or high ability or to other populations, it might be interesting to replicate the research using a stronger experimental design with a control group, a larger sample randomly selected as well as randomly assigned to treatment. Only at that point would it be possible to ascertain the relationship between the level of ability and the level of strategic planning skills.

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Appendix A

Letters of Information and Consent

Information Letter

Faculty of Education
McGill University
Educational Psychology and Counselling
3700 Mc Tavish

Dear Parent(s),

July, 1990

My name is Maryse Lucbert, an MEd student in Educational Psychology at McGill and I would like to observe the children attending the computer afternoon program at the Gifted Summer School, in July, this summer. The purpose of my study is to understand the planning skills of children using a new computer game.

It will give your son/daughter an opportunity to play with this new challenging game for two thirty-minute periods per week during two weeks.

Observations will be recorded in a log book, on the computer and videotaped, and will be held strictly confidential.

This study is important because it will contribute to discover new uses of computers with gifted children, at school outside the traditional curriculum and setting, and beyond school on the job-market, at home and, in the community.

You will find attached, a letter of consent which should be returned the following day. I will be pleased to send you a summary of the research results if you wish (* see note). Thank you for your cooperation. You can contact me or leave a message at McGill (398-4252/4253).

_____
Maryse Lucbert

_____
Dr. Glenn Cartwright, supervisor

Return this part if you are interested

Note: Will you please send me a summary of the research results at the following address:

NAME: _____
ADDRESS: _____
_____

Letter of Consent

I (Miss/Mrs/Mr._____authorize to include my daughter/son _____ as a subject in the study of Maryse Lucbert (M.Ed. in Educational Psychology, McGill). I agree to let my daughter/son participate in the study using a computer simulation game which will take place during his/her regular afternoon computer program at the Gifted Summer School.

The purpose and the description of the study and my daughter/son's participation have all been explained in the Information Letter and I am aware of what they entail. Total privacy will be kept, all information will stay confidential and will only be used for the purpose of this research. Furthermore, I can withdraw my daughter/son from this study at any time.

_____ ____/____/____
Parent or tutor's signature Date

_____ ____/____/____
Student's signature Date

*P.S.: Can you please return this letter by tomorrow.

GENERAL INFORMATION ON THE CHILD:

NAME:_____DATE OF BIRTH:____/____/____

GRADE LEVEL 1989-90:_____

Lettre d'Information

Faculté d'Education
Université McGill
Psychologie Educationelle et Counselling
3700 rue Mc Tavish

Cher parent, Le 30 juillet, 1990

Je me présente, Maryse Lucbert, responsable des tout-petits au Centre de Loisirs St-Isaac-Jogues. Je suis étudiante à la Maîtrise en Psychologie Educationelle à McGill et j'aimerais inclure dans ma recherche, les jeunes du groupe des 10-12 ans du troisième séjour cet été.

Je m'intéresse aux stratégies de planification des jeunes utilisant un logiciel de conception d'aventures. Votre enfant aurait la chance d'essayer un nouveau jeu informatisé pendant deux périodes de trente minutes par semaine pour deux semaines. Les observations seront notées dans un journal de bord, sur ordinateur, et filmées, mais elles resteront confidentielles.

Cette étude est importante car elle contribuera à découvrir de nouvelles utilisations de l'ordinateur pour une éducation de plus en plus stimulante, à l'école et dans d'autres contextes tels qu'aux loisirs, à la maison ou dans la communauté.

Vous trouverez ci-joint, une lettre de consentement à signer et retourner le jour suivant. Je serais heureuse de vous faire parvenir un résumé des résultats de recherche (* voir note). Je vous remercie pour votre collaboration. Vous pouvez me contacter ou me laisser un message au Centre St-Isaac-Jogues (872-6699).

_____
Maryse Lucbert

_____
Dr. Glenn Cartwright, superviseur

Retournez cette partie, si vous êtes intéressé(e)s

Note: Envoyez-moi les résultats de recherche à l'adresse suivante:

NOM: _____
Adresse: _____
_____

Lettre de Consentement

M./Mme/Mlle_____authorise Maryse Lucbert (M.Ed. Psychologie Educationelle, McGill) à inclure mon fils/ma fille _____ dans sa recherche utilisant un logiciel d'EAO (Enseignement Asssisté par Ordinateur) qui se déroulera cet été, pendant les heures régulières du camp de vacances au Centre de Loisirs St-Isaac-Jogues.

Le but, la description de la recherche, la participation de mon fils/ma fille, m'ont été expliqués dans la lettre d'information et j'en connais les implications. Toutes les informations resteront confidentielles et ne seront utilisées que dans le cadre de cette recherche. De plus, je suis libre de retirer mon fils/ma fille de cette étude, à tout moment.

_____ ____/____/____
Signature du parent ou tuteur/trice Date

_____ ____/____/____
Signature du jeune Date

*P.S.: Pouvez-vous retourner cette lettre le plus vite possible S.V.P., Merci de votre collaboration.

INFORMATIONS GENERALES SUR L'ENFANT

NOM:_____DATE DE NAISSANCE:____/____/____

ANNEE SCOLAIRE 1989-90:_____

Appendix B

Informal Questionnaires

INFORMAL QUESTIONNAIRE

1. NAME:_____ GROUP:_____

2. AGE: _____ BIRTHDATE:__/__/

3. GRADE 1990: ___

4 WHAT IS YOUR MOTHER TONGUE: ENGLISH __ FRENCH __ OTHER __

5. ARE YOU BILINGUAL OR IN AN IMMERSION PROGRAM? YES __ NO __

5. IS IT THE 1ST TIME YOU USE A COMPUTER? YES__ NO__ SINCE____

7. DO YOU HAVE A COMPUTER AT HOME? YES __ NO __

8. DO YOU HAVE A COMPUTER AT SCHOOL? YES __ NO __

9. HAVE YOU PLAYED WITH AN ADVENTURE GAME BEFORE? YES __ NO __

   IF YES, WHICH ONE?_____

10. HAVE YOU PLAYED WITH SCARABEE BEFORE? YES __ NO __

11. HAVE YOU LIKED THE GAME? YES __ NO __

12. WHAT HAVE YOU ENJOYED THE MOST? _____

13. WHAT HAVE YOU ENJOYED THE LEAST? _____

14. DO YOU THINK YOUR PLANNING SKILLS HAVE IMPROVED? YES__ NO__

    WHY?_____

15. WHAT KIND OF SCHOOL/PROGRAM ARE YOU IN? _____

16. IS IT A REGULAR PROGRAM? __ ENRICHED? __GIFTED? __LD? __

17. SINCE HOW LONG HAVE YOU BEEN IN THIS SUMMER PROGRAM? _____

18. HOW HAVE YOU HEARD ABOUT THE PROGRAM? _____

19. COMMENTS: _____

QUESTIONNAIRE INFORMEL

1. NOM: _____ GROUPE: ____

2. AGE: _____ DATE DE NAISSANCE: __/__/__

3. ANNEE 1990: ___

4. QUELLE EST TA LANGUE MATERNELLE: FRAN. __ ANGL. __ AUTRE __

5. ES-TU BILINGUE OU DANS UN PROGRAMME IMMERSION ? OUI__ NON__

6. EST-CE TA 1E UTILISATION D'ORDINATEUR? OUI__ NON__ DEPUIS____

7. AS-TU UN ORDINATEUR A LA MAISON? OUI __ NON __

8. AS-TU UN ORDINATEUR A L'ECOLE? OUI __ NON __

9. AS-TL DEJA JOUE A UN JEU D'AVENTURE INFORMATISE? OUI__ NON__

   SI OUI, LEQUEL? _____

10. AS-TU DEJA JOUE A SCARABEE AVANT? OUI__ NON__

11. AS-TU AIME LE JEU? OUI __ NON __

12. QU'EST-CE QUE TU AS AIME LE PLUS? _____

13. QU'EST-CE QUE TU AS AIME LE MOINS? _____

14. PENSES-TU QUE TES STRATEGIES DE PLANIFICATION SE SONT AMELIOREES? OUI__ NON__POURQUOI?_____ 15. DANS QUEL GENRE D'ECOLE/PROGRAM ES-TU? _____

16. EST-CE UN PROGRAMME REGULIER? __ ENRICHI? __DOUE? __TA? __

17. DEPUIS QUAND ES-TU DANS CE PROGRAMME D'ETE? _____

18. COMMENT AS-TU ENTENDU PARLER DE CE PROGRAMME D'ETE? _____

19. COMMENTAIRES: _____

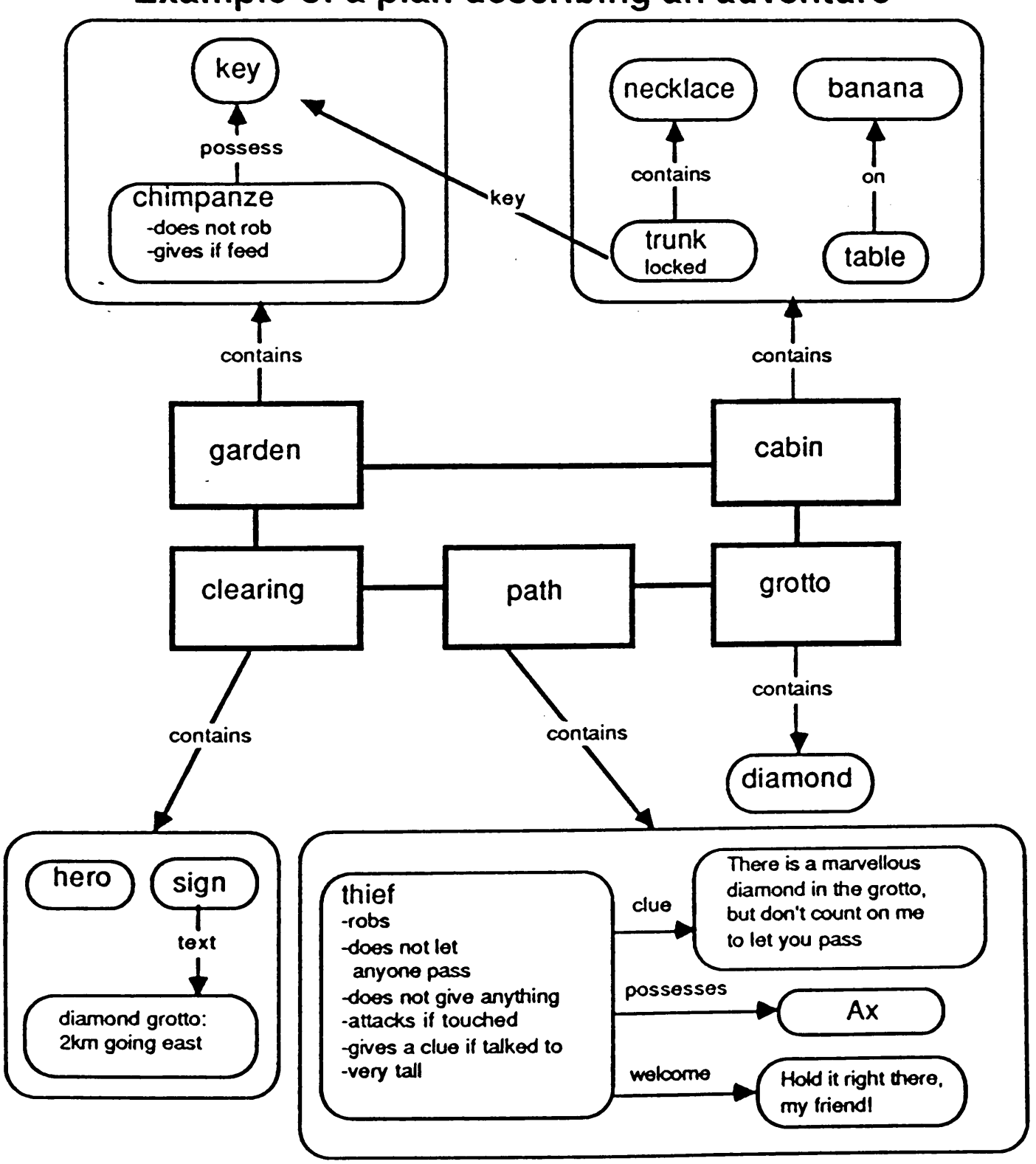
Appendix C

Instructions and Computer Program Manual of SCARABEE

0.3 What is an adventure game?

Computer games can be classified into three categories: arcade games, strategy games, and adventure games. Arcade games such as PACMAN are the best known computer games. Most of the time, those games only challenge the player's reflexes. Strategy games such as chess or wargames are usually for adults. Finally, adventure games such as ADVENTURE or ZORK are interactive fictional narrativesIn summary, an adventure game is like a computerized treasure hunt. The player must explore an unknown universe consisting of a network of locations which contain objects and characters with varied properties. The goal of the game is generally to accumulate treasures while overcoming assorted obstacles.

Example of a plan describing an adventure



Loading the program

Once the DOS system has been installed on the **S.C.A.R.A.B.E.E.** disk (see section "Installing Dos"), you are ready to load **S.C.A.R.A.B.E.E.**

If your micro-computer has a color monitor
type **SCARABEE** and press **RETURN** or ↵

If your micro-computer has a monochrome monitor
type **SCARABEE MONO** and press **RETURN** or ↵

Command keys

Use the **Arrow keys** (↓, ↑, → or ←) to move the cursor and highlight the item you wish to select.

Press **RETURN** or ↵ to select the item.

Press **BACKspace** to remove an item.

Press the **ESCape** key (located at the top left of the keyboard) to close a window or menu.

To get HELP press any function key (**F1** to **F10**).

Summary of keyboard commands

Arrow keys to move the cursor (↓) (→) (←) (↑)

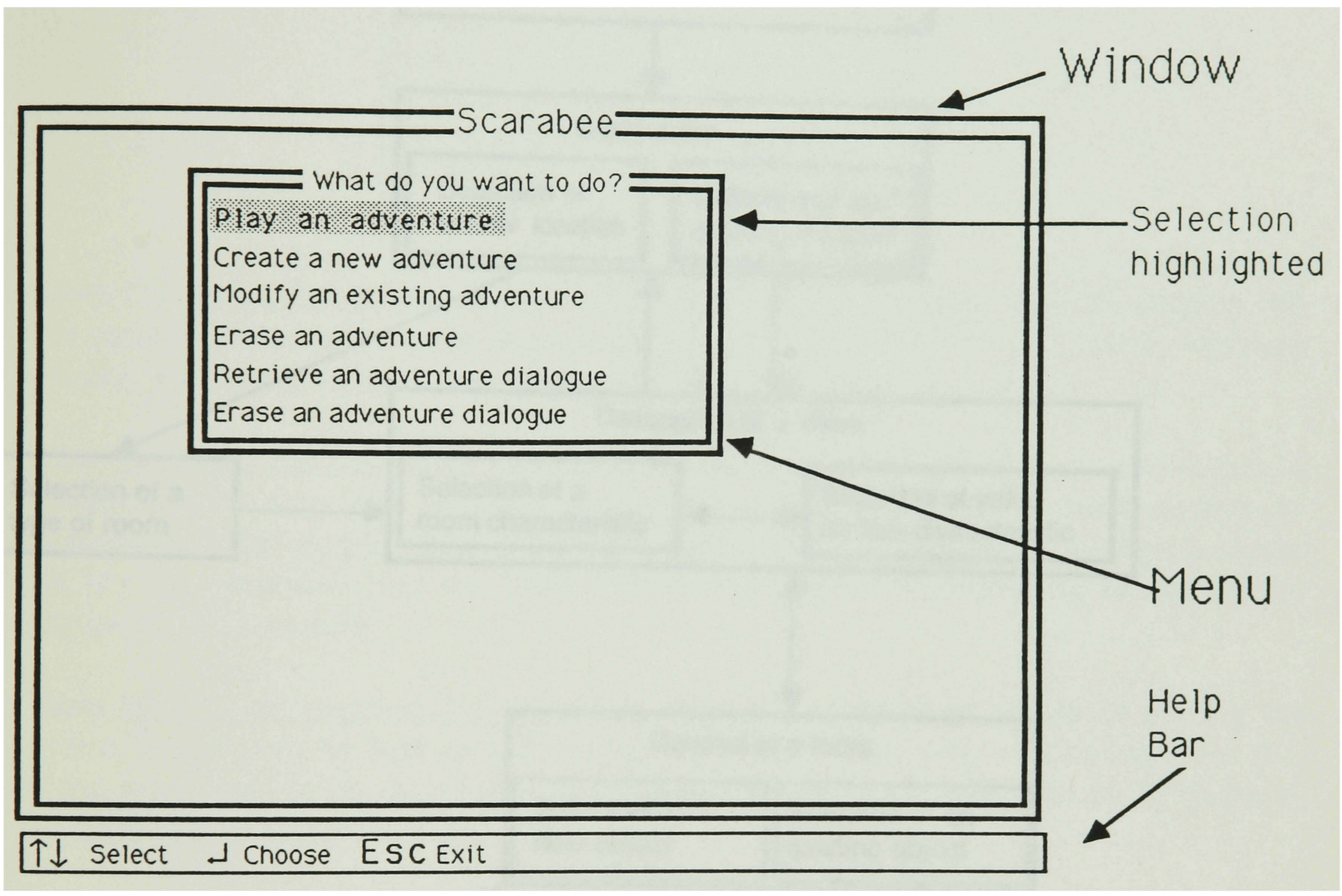
RETURN key or (↵) **to select an item**

ESCape key or (ESC) **to close a window or a menu**

BACKspace key or (EFF) **to remove or erase**

FUNCTION key or (F1) **...** (F10) **to get HELP**

While several windows may be open at the same time on the screen, only one window or menu may be active at a time. Using the **Arrow keys** (↓, ↑, → or ←) the student places the cursor inside the active window and highlights an item.

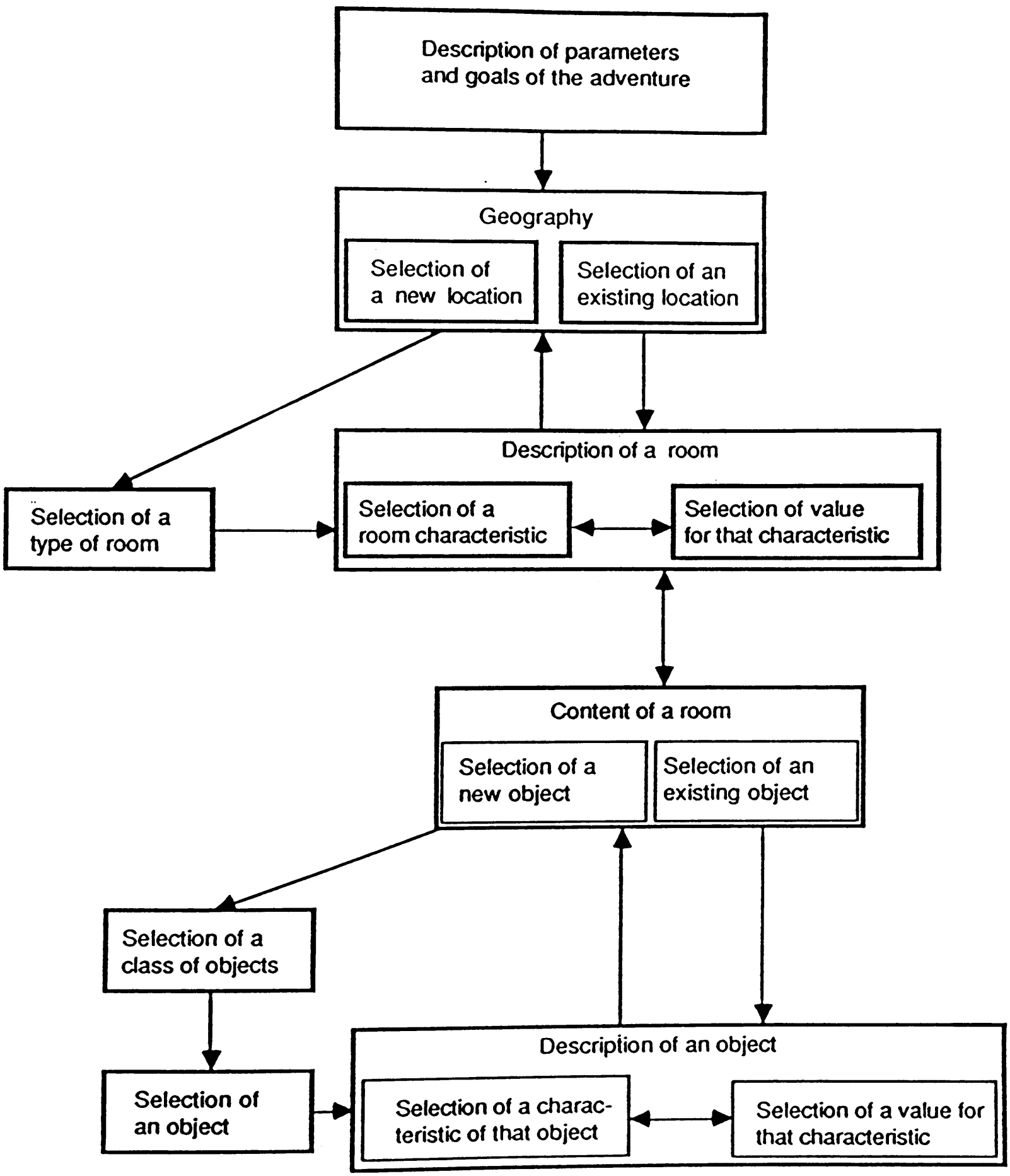


Pressing **RETURN** or ↵ will select the item. To close a window press **ESCape.** A **Help bar** along the bottom of the screen provides information on the command keys.

Menus

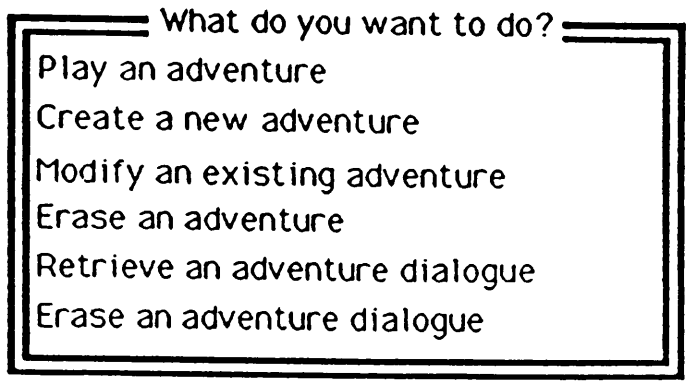
A menu provides the student with a list of items or possible choices. The student uses the **Arrow** keys (↓ or ↑) to highlight a choice and then presses **RETURN** or ↵ to confirm that choice. To exit from a menu, press **ESCape.**

Interaction of processes involved in the creation of an adventure



2.3 The Principal Menu

The principal menu of S.C.A.R.A.B.E.E., **Choose what you want to do** presents six options:



Choosing the item Play an adventure, presents the student with a menu containing the titles of various adventures which have already been created. S.C.A.R.A.B.E.E. will then go into play mode where it will engage the student in a dialogue.

The item Create a new adventure, as its title indicates, allows the student to create a new adventure starting from scratch. Selecting this item will cause a menu to appear which deals with defining the features an adventure (i.e. creating a title, author, location etc.) It is recommended that the novice to S.C.A.R.A.B.E.E. begin by modifying an already existing adventure.

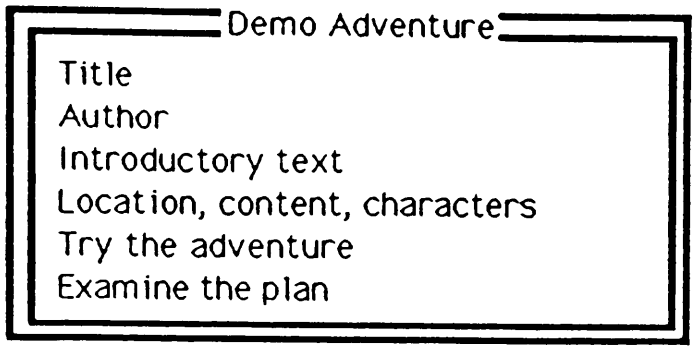
The item Modify an existing adventure permits the student to create or modify an adventure based on one that already exists. It will be necessary to choose from the menu the adventure to be modified and this selection will call up the menu for defining the features of the adventure.

The items Erase an adventure and Erase an adventure dialogue provide the student with the possiblilty of removing adventures or adventure dialogues which have been saved on the student's disk. These two options allows one to 'clean up' the disks when desired.

Finally the item Retrieve an adventure dialogue allows an examination of a dialogue resulting from an interaction with S.C.A.R.A.B.E.E. It is an exact transcription of the student's statements and the replies of S.C.A.R.A.B.E.E. This text can serve as a guide to the student in developing his own adventure.

2.4 The Adventure Definition Menu

To create or modify an adventure, the student must choose from the adventure definition menu.



The option Title allows the student to choose an original title for the adventure. The student simply writes the desired title in the text window.

Choosing the item, Author causes a text window to open in which the creator/s of the adventure write their names (or any names they wish for that matter). In the play mode at the beginning of the adventure, these names will appear as the authors.

Selecting the item Introductory text, opens a text window where the student writes an introduction to the adventure. In play mode this text will appear at the beginning of the adventure. The introductory text broadly describes the context of the adventure: the country and period during which the action takes place, the goal of the adventure, i.e. the treasures to be unearthed.

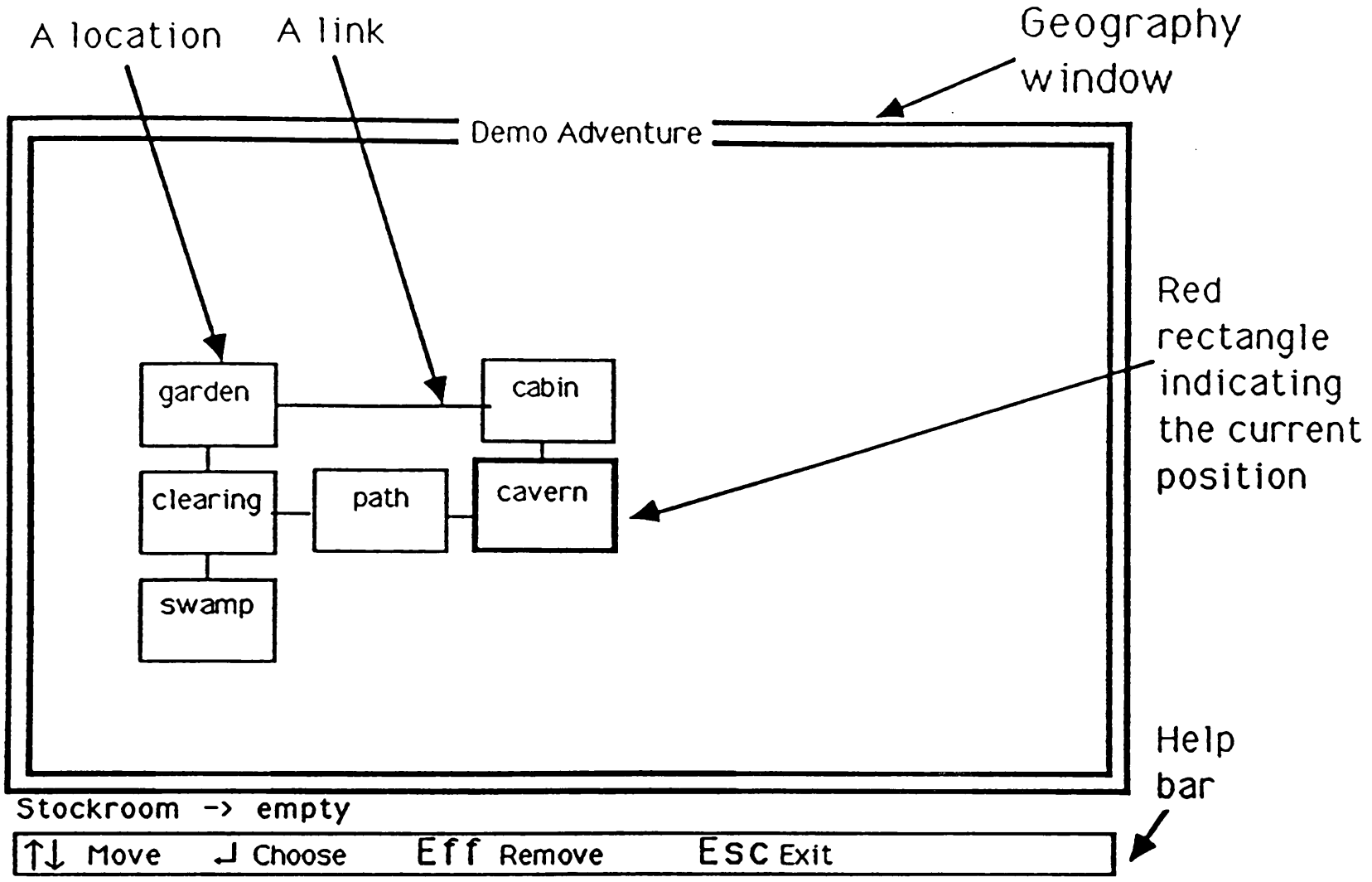
The real work in creating an adventure only begins with choosing the option Location, content, characters. The student is presented with the geography window where it is necessary to re-define the locations appropriate to the adventure.

The option Try the adventure allows the student to try out the adventure even before it is completed. In this way it is possible to set up a sub-goal for the adventure and test it. Creating an adventure using S.C.A.R.A.B.E.E. is a process which proceeds by stages and should be built up and refined gradually. Step by step the student is thus led to develop an adventure more and more interesting and complex while testing its logic and coherence at every step of the way. The concept of a gradual process underlying the construction of an adventure is essential to the philosophy of S.C.A.R.A.B.E.E.

The last item of the menu, Examine the plan, permits the student to examine a detailed plan of the created adventure. The plan describes each location of the adventure along with the relevant characters and objects. This plan is extremely useful when editing the adventure. The student can examine the plan on the computer screen or as a printed copy.

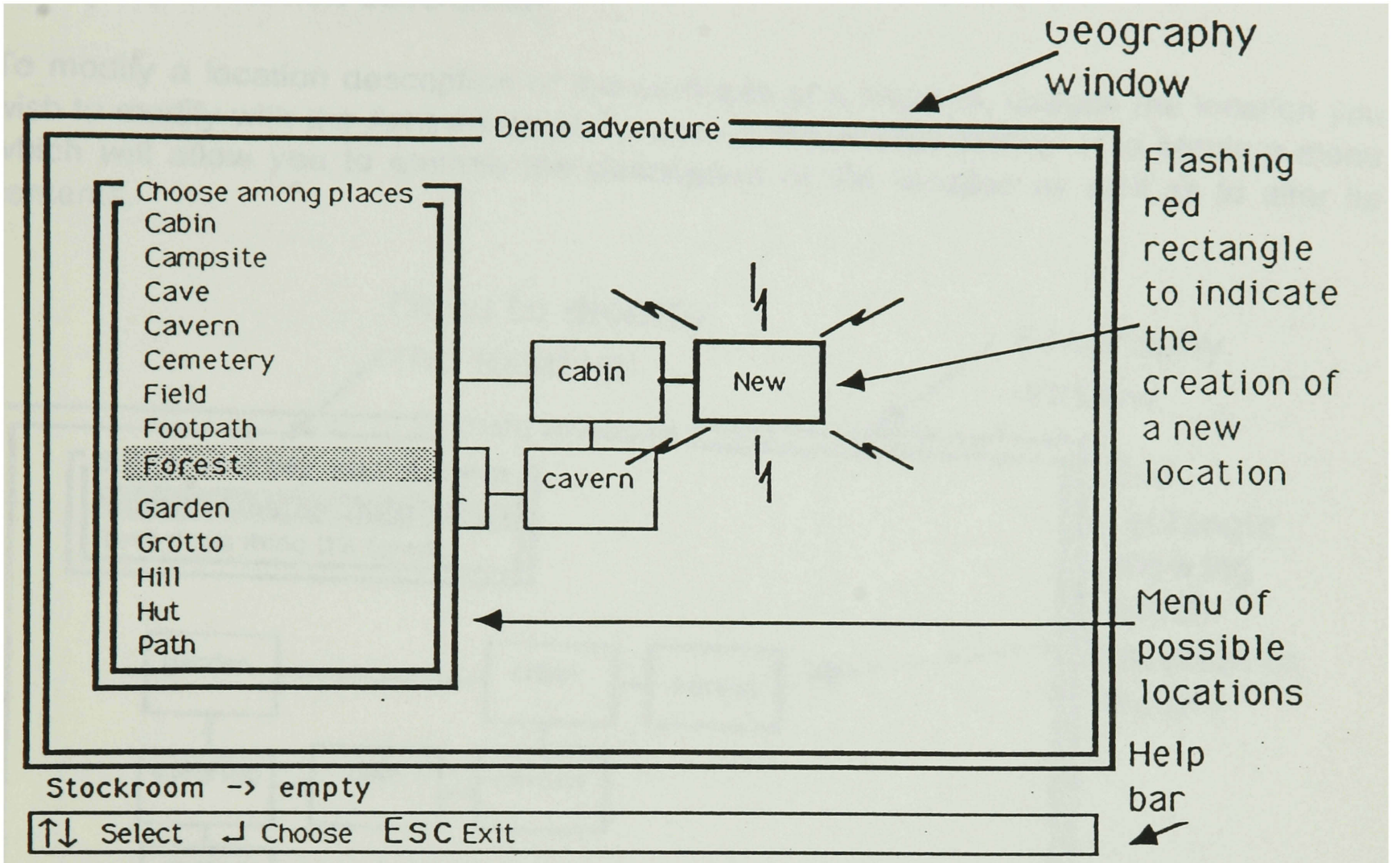
2.5 The Geography Window

The geography window is where the student develops the various locations of the adventure.



To add a new location description

To add a new location the student moves the red rectangle to an empty area within the geography window using the **Arrow** keys (↓, ↑, → or ←). A red rectangle entitled **New** will begin to flash. This flashing red rectangle indicates that S.C.A.R.A.B.E.E. is waiting for the student to press **RETURN** or ↵ in order to present the student with a menu containing possible location descriptions or settings. This is a general procedure for adding an object to any content window.



To remove a location description

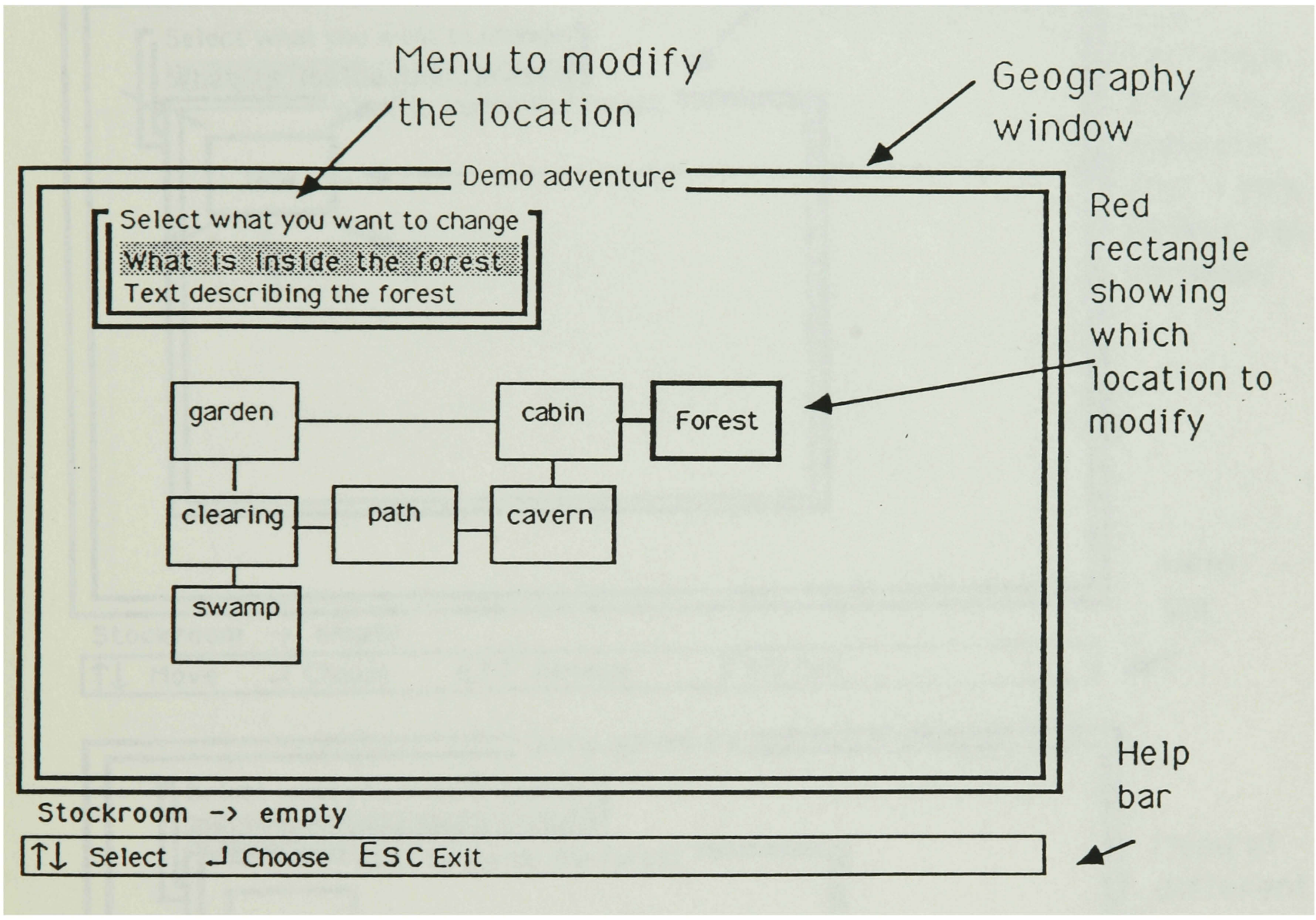
To remove a location description or a link between two settings the student must highlight the location or link using the **Arrow** keys (↓ or ↑). The rectangle or link will now appear in red. To remove the highlighted item press **BACK**space.

N.B. It is important that each location of the setting be linked to the overall setting.

In play mode it is not possible to have a setting location isolated from the others. The student must create a link or road between the isolated location and any other location which is part of the setting. To create this link use the **Arrow** keys (↓, ↑, → or ←) to move the red rectangle from one of the locations toward another location. A temporary blinking link will appear in red. Pressing **RETURN** or ↵ will confirm the establishment of the link.

To modify a location description

To modify a location description or the contents of a location, choose the location you wish to modify with the **Arrow** keys (↓, ↑, → or ←). Press **RETURN** or ↵ to obtain a menu which will allow you to change the description of the location as well as to alter its contents.

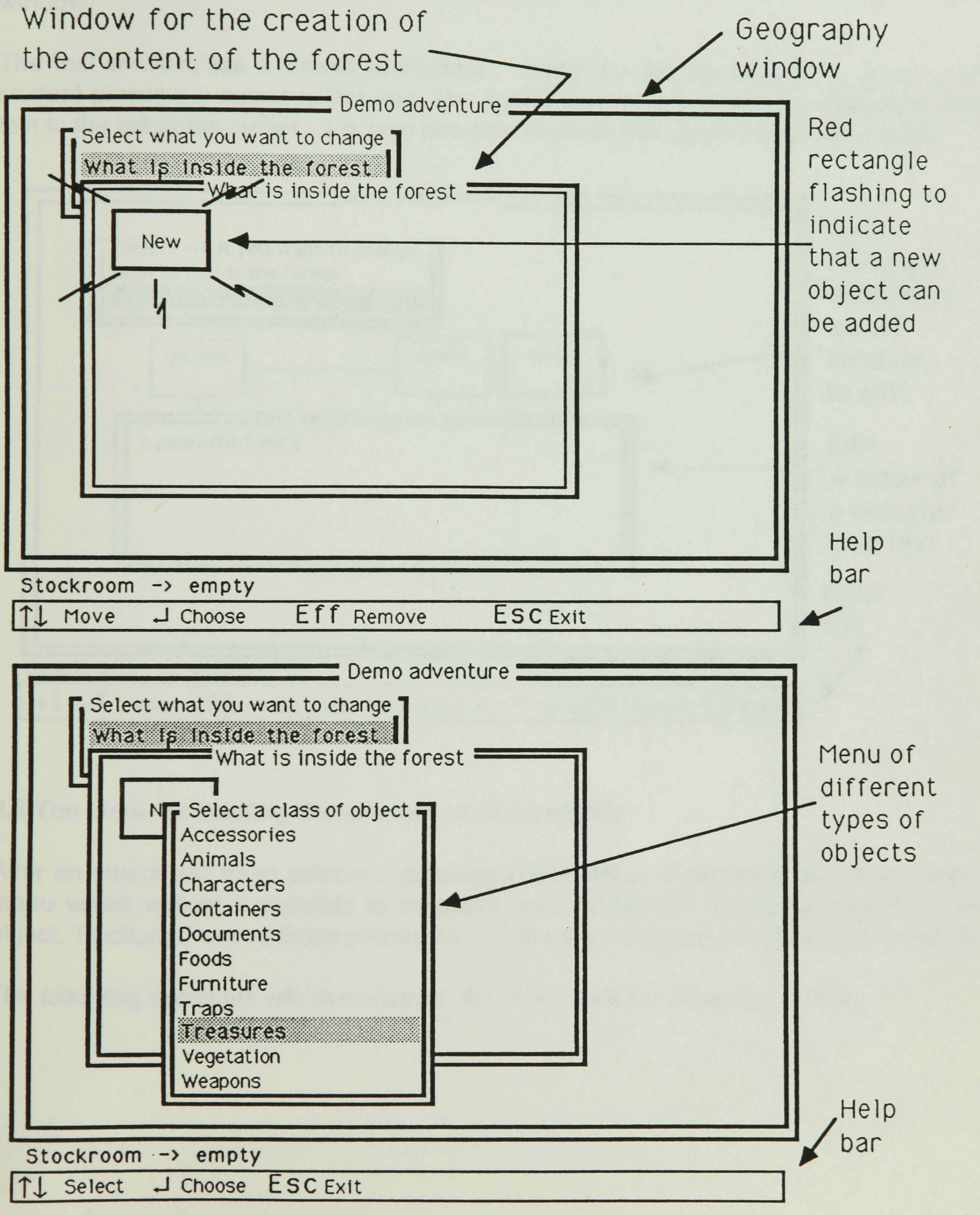


2.6 The Contents Window

A contents window contains all of the objects found in a particular location or those objects which are located within other objects. The student may add, remove or select an object from the contents window using the **Arrow** keys (↓, ↑, → or ←). The selected item will be appear within a red rectangle. Pressing **RETURN** or ↵ will confirm the choice.

Adding an object to the contents window: To add an object to the contents window the student must move the red rectangle to an empty spot in the window using the **Arrow** keys (↓, ↑, → or ←). The red rectangle will begin to flash. Pressing **RETURN** or ↵ will confirm the choice. In general a flashing red rectangle signals the fact that

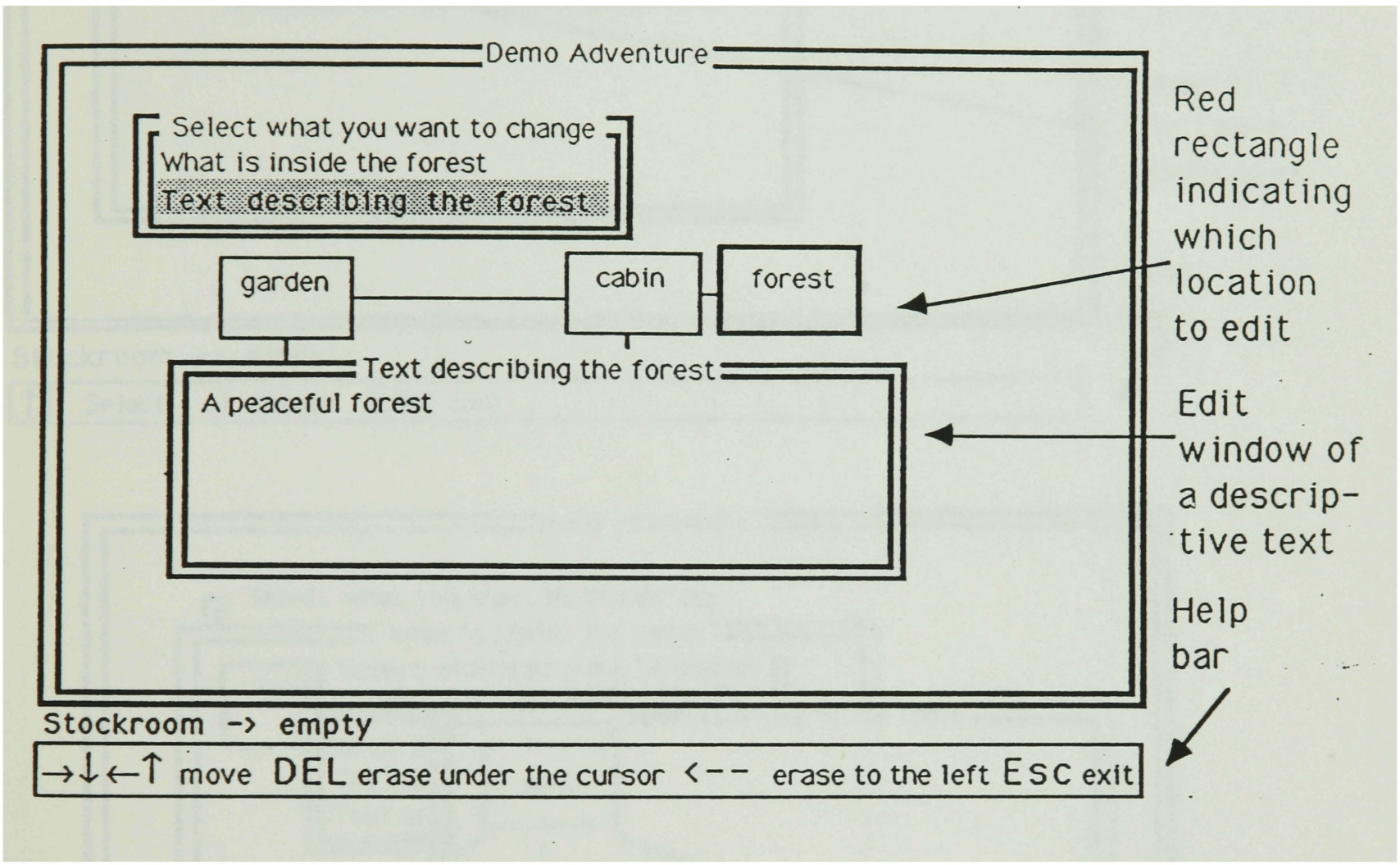
S.C.A.R.A.B.E.E. is waiting for the student to press **RETURN** or ↵ in order to present the student with a menu.



2.7 The Text window

To modify the description of an object or a location the student has access to a text window.

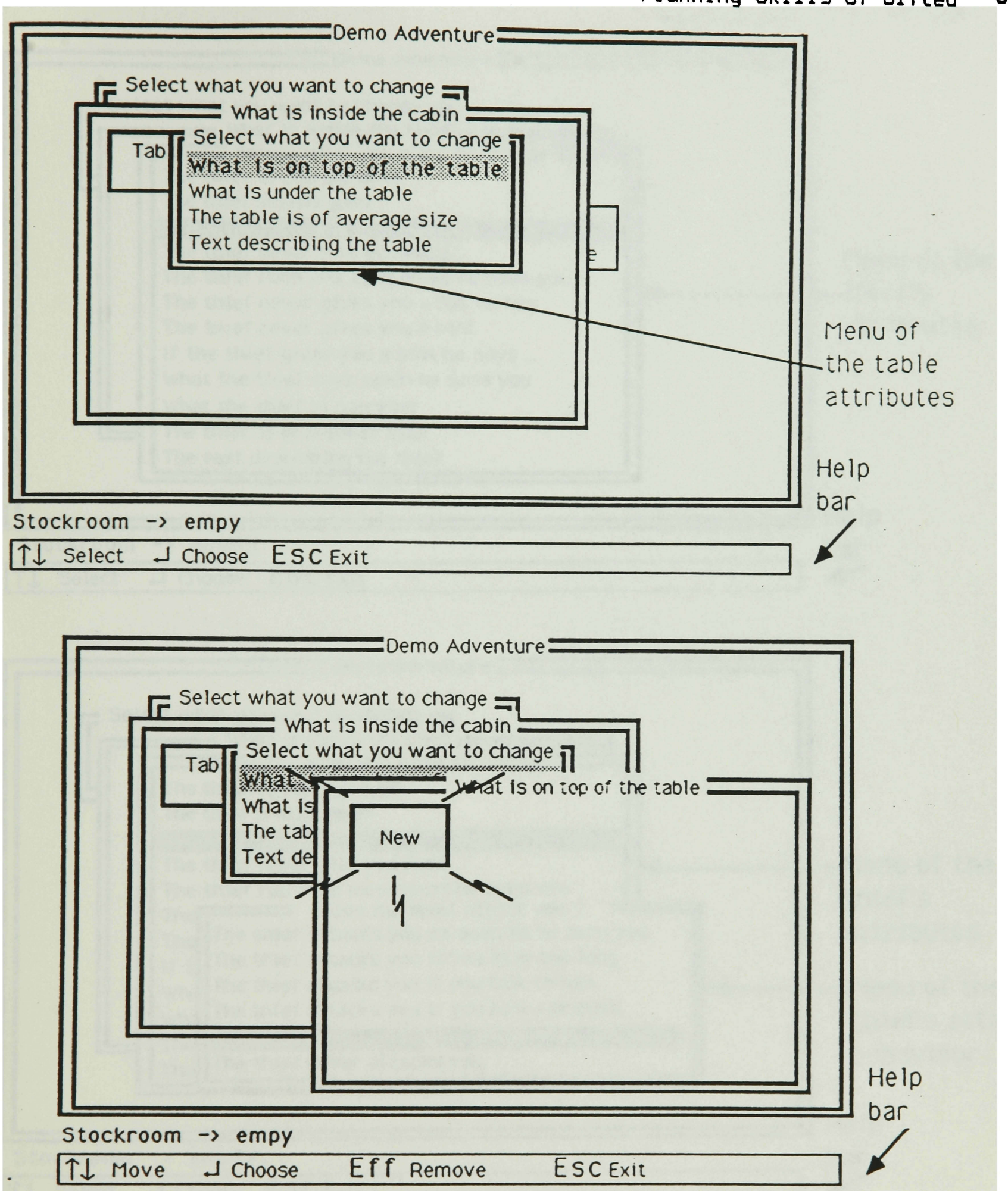
The text window has a simple text editor. Using the **Arrow** keys (↓, ↑, → or ←) the student places the cursor in the text. The **BACKspace** key allows the student to erase text to the left of the cursor. It is also possible to erase text directly under the cursor.



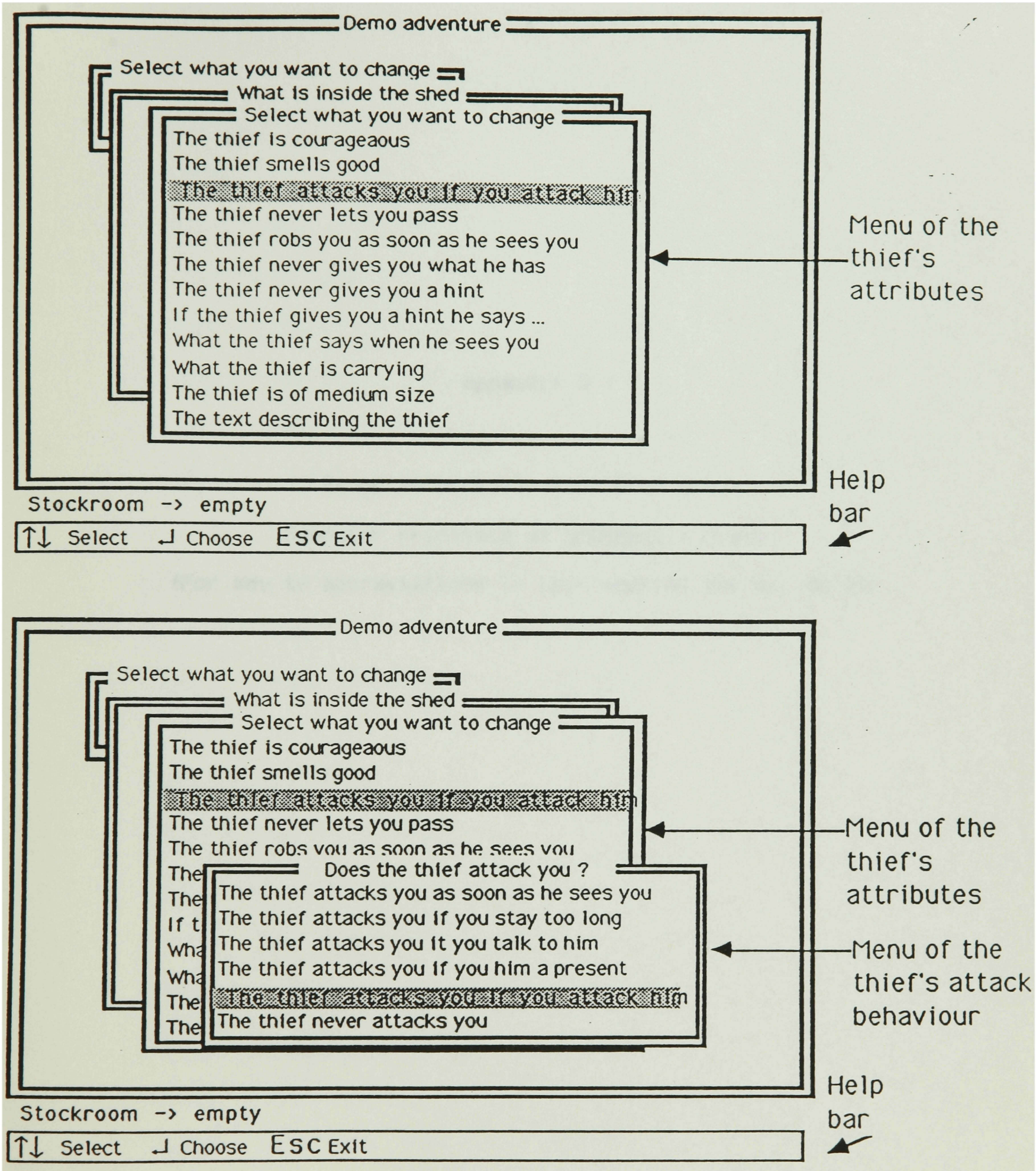
2.8 The Menu containing the properties of an object

After an object has been selected, pressing **RETURN** or ↵ presents the student with a menu which makes it possible to examine and modify the various properties of the object. To change one of these properties the student must first select the item to modify.

The following exercises will demonstrate the procedure for using the menus.



N.B.An attempt to place a large object on or in a smaller object will result in a message stating that it is impossible to carrry this out.


Demo adventure
Select what you want to change
What is inside the shed
Select what you want to change
The thief is courageaous
The thief smells good
The thief attacks you if you attack him
The thief never lets you pass
The thief robs you as soon as he sees you
The thief never gives you what he has
The thief never gives you a hint
If the thief gives you a hint he says ...
What the thief says when he sees you
What the thief is carrying
The thief is of medium size
The text describing the thief
Menu of the thief's attributes
Stockroom -> empty
↑↓ Select ↵ Choose ESC Exit
Help bar
Demo adventure
Select what you want to change
What is inside the shed
Select what you want to change
The thief is courageaous
The thief smells good
The thief attacks you if you attack him
The thief never lets you pass
The thief robs you as soon as he sees you
Does the thief attack you ?
The thief attacks you as soon as he sees you
The thief attacks you if you stay too long
The thief attacks you it you talk to him
The thief attacks you if you him a present
The thief attacks you if you attack him
The thief never attacks you
Menu of the thief's attributes
Menu of the thief's attack behaviour
Stockroom -> empty
↑↓ Select ↵ Choose ESC Exit
Help bar

Appendix D

Examples of Evaluation Grid and Computer Printouts of SCARABEE's Plans

(For key to abbreviations in this section see pp. 88-89)

EVALUATION GRID

LOCATION 1

LOCNUMB 8

L1LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L1CONT (# OF OBJECTS) 1

L1DESC MOD 0/10 PER 2/10 MODPER 0/10

L1HERO MOD 1/10 PER 3/10 MODPER 1/10

L1OB1 MOD /10 PER /10 MODPER /10

L1OB2 MOD /10 PER /10 MODPER /10

L1CHA1 MOD /10 PER /10 MODPER /10

L1CHA2 MOD /10 PER /10 MODPER /10

L1ANI1 MOD /10 PER /10 MODPER /10

L1ANI2 MOD /10 PER /10 MODPER /10

LOCATION 2

L2LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L2CONT (# OF OBJECTS) 1

L2DESC MOD 0/10 PER 2/10 MODPER 0/10

L2OB1 MOD 1/10 PER 0/10 MODPER 1/10

L2OB2 MOD /10 PER /10 MODPER /10

L2CHA1 MOD /10 PER /10 MODPER /10

L2CHA2 MOD /10 PER /10 MODPER /10

L2ANI1 MOD /10 PER /10 MODPER /10

L2ANI2 MOD /10 PER /10 MODPER /10

LOCATION 3

L3LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L3CONT (# OF OBJECTS) 3

L3DESC MOD 0/10 PER 2/10 MODPER 0/10

L3OB1 MOD 0/10 PER 3/10 MODPER 6/10

L3OB2 MOD 1/10 PER 3/10 MODPER 1/10

L3CHA1 MOD 0/10 PER 3/10 MODPER 0/10

L3CHA2 MOD /10 PER /10 MODPER /10

L3ANI1 MOD /10 PER /10 MODPER /10

L3ANI2 MOD /10 PER /10 MODPER /10

LOCATION 4

L4LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L4CONT (# OF OBJECTS) 3

L4DESC MOD 0/10 PER 2/10 MODPER 0/10

L4OB1 MOD 0/10 PER 3/10 MODPER 0/10

L4OB2 MOD 0/10 PER 3/10 MODPER 0/10

L4CHA1 MOD 0/10 PER 0/10 MODPER 0/10

L4CHA2 MOD /10 PER /10 MODPER /10

L4ANI1 MOD /10 PER /10 MODPER /10

L4ANI2 MOD /10 PER /10 MODPER /10

LOCATION 5

L5LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L5CONT (# OF OBJECTS) 3

L5DESC MOD 0/10 PER 2/10 MODPER 0/10

L5OB1 MOD 8/10 PER 19/10 MODPER 8/10

L5OB2 MOD 0/10 PER 10/10 MODPER 0/10

L5CHA1 MOD 0/10 PER 10/10 MODPER 0/10

L5CHA2 MOD /10 PER /10 MODPER /10

L5ANI1 MOD /10 PER /10 MODPER /10

L5ANI2 MOD /10 PER /10 MODPER /10

LOCATION 6

L6LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L6CONT (# OF OBJECTS) 2

L6DESC MOD 0/10 PER 2/10 MODPER 0/10

L6OB1 MOD 6/10 PER 3/10 MODPER 0/10

L6OB2 MOD 6/10 PER 2/10 MODPER 0/10

L6CHA1 MOD /10 PER /10 MODPER /10

L6CHA2 MOD /10 PER /10 MODPER /10

L6ANI1 MOD /10 PER /10 MODPER /10

L6ANI2 MOD /10 PER /10 MODPER /10

LOCATION 7

L7LIGHT MOD 0/1 PER 1/1 MODPER 0/1

L7CONT (# OF OBJECTS) 4

L7DESC MOD 0/10 PER 2/10 MODPER 0/10

L7OB1 MOD 0/10 PER 3/10 MODPER 0/10

L7OB2 MOD 0/10 PER 3/10 MODPER 0/10

L7CHA1 MOD 0/10 PER 3/10 MODPER 0/10

L7CHA2 MOD 0/10 PER 3/10 MODPER 0/10

L7ANI1 MOD /10 PER /10 MODPER /10

L7ANI2 MOD /10 PER /10 MODPER /10

LOCATION 8

L8LIGHT MOD 0/1 PER 0/1 MODPER 0/1

L8CONT (# OF OBJECTS) 2

L8DESC MOD 0/10 PER 2/10 MODPER 0/10

L8OB1 MOD 0/10 PER 0/10 MODPER 0/10

L8OB2 MOD /10 PER /10 MODPER /10

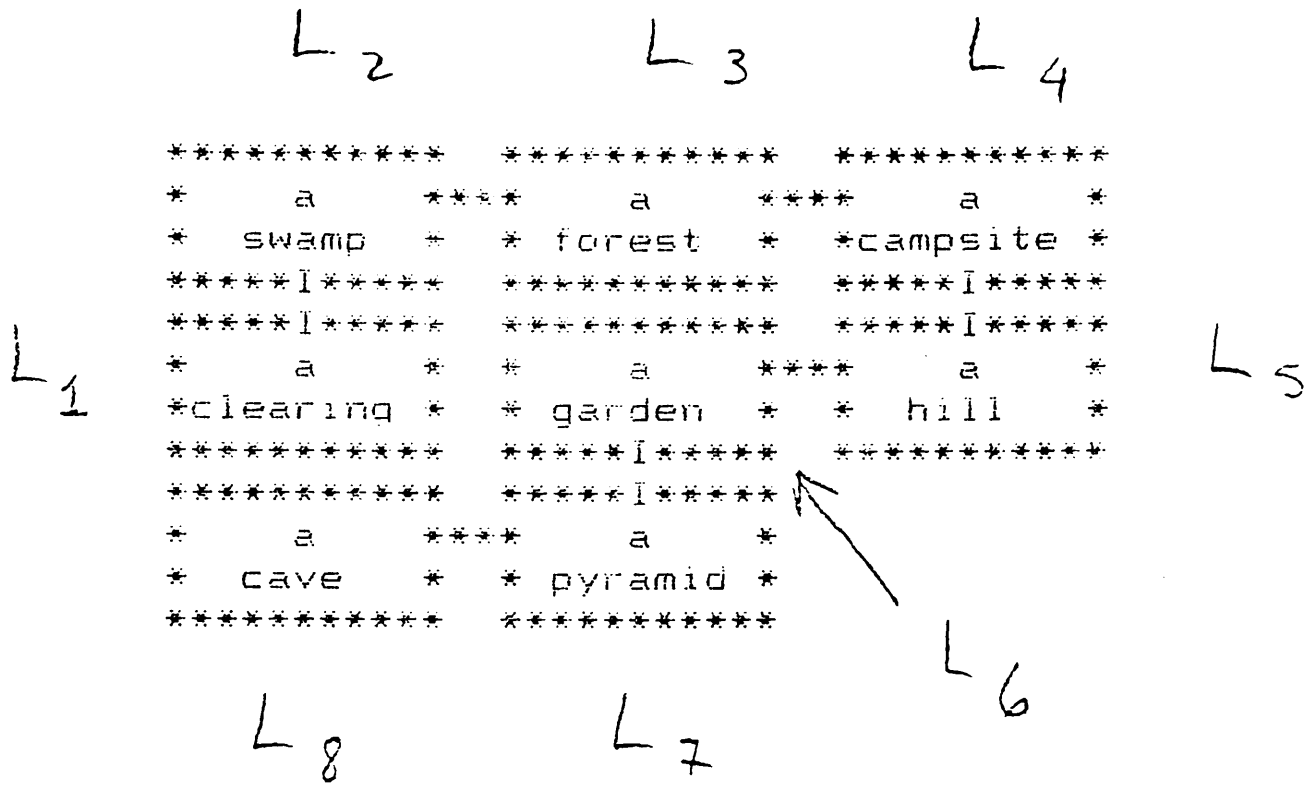
L8CHA1 MOD /10 PER /10 MODPER /10

L8CHA2 MOD 0/10 PER 0/10 MODPER 0/10

Total MOD 17/100
PER 92/100
MODPER 17/100

ou're in a jungle, you're tarzan and you have to save an ape.

----------GEOGRAPHY----------



----------DESCRIPTION----------

Your mission is to gather together the 2 hidden treasures.
A plain old clearing.
In the clearing you see ...
  A brave, young adventurer.
  You're carrying ...
    A New Zeland leg of lamb with mint jelly.

L1

A plain old swamp.
In the swamp you see ...
  Dangerous quicksand.
    On the quicksand you see ...
      A chili pepper.

L2

A plain old forest.
In the forest you see ...
  A plain old stone.
  A plain old tree.
  In the tree you see ...
    A skeleton key.
  A plain old tree.
    There is nothing in the tree.

L3

A plain old campsite.
In the campsite you see ...
  A pretty little wildflower.
  A weathered, old skeleton.
  A plain old pit.

L4

030

A plain old hill.
In the hill you see ...
A pretty little wildflower.
A plain old stone.
A strange character.
The hunter is not carrying anything.

L5

67

173
030
plan 1

A plain old garden.
In the garden you see ...
A plain old boulder.
A plain old tree.
There is nothing in the tree.

L6

A plain old pyramid.
In the pyramid you see ...
A plain old whip.
A pepperoni pizza from the Pizza Tent.
A plain old crown.
A plain old diamond.

L7

A plain old cave.
It's pitch black inside the cave.
In the cave you see ...
A strange character.
The chimpanzee is not carrying anything.
A plain old pit.

L8

EVALUATION GRID

LOCATION 1

LOCNUMB 7

L1LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L1CONT (# OF OBJECTS) 2

L1DESC MOD 0/10 PER 2/10 MODPER 0/10

L1HERO MOD 0/10 PER 3/10 MODPER 0/10

L1OB1 MOD 0/10 PER 3/10 MODPER 6/10

L1OB2 MOD /10 PER /10 MODPER /10

L1CHA1 MOD /10 PER /10 MODPER /10

L1CHA2 MOD /10 PER /10 MODPER /10

L1ANI1 MOD /10 PER /10 MODPER /10

L1ANI2 MOD /10 PER /10 MODPER /10

LOCATION 2

L2LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L2CONT (# OF OBJECTS) 3

L2DESC MOD 0/10 PER 2/10 MODPER 0/10

L2OB1 MOD 0/10 PER 3/10 MODPER 0/10

L2OB2 MOD 0/10 PER 3/10 MODPER 0/10

L2CHA1 MOD 0/10 PER 3/10 MODPER 0/10

L2CHA2 MOD /10 PER /10 MODPER /10

L2ANI1 MOD /10 PER /10 MODPER /10

L2ANI2 MOD /10 PER /10 MODPER /10

LOCATION 3

L3LIGHT MOD 0/1 PER 1/1 MODPER 0/1

L3CONT (# OF OBJECTS) 1

L3DESC MOD 0/10 PER 2/10 MODPER 0/10

L3OB1 MOD 0/10 PER 3/10 MODPER 0/10

L3OB2 MOD /10 PER /10 MODPER /10

L3CHA1 MOD /10 PER /10 MODPER /10

L3CHA2 MOD /10 PER /10 MODPER /10

L3ANI1 MOD /10 PER /10 MODPER /10

L3ANI2 MOD /10 PER /10 MODPER /10

LOCATION 4

L4LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L4CONT (# OF OBJECTS) 4

L4DESC MOD 0/10 PER 2/10 MODPER 0/10

L4OB1 MOD 0/10 PER 3/10 MODPER 0/10

L4OB2 MOD 0/10 PER 3/10 MODPER 0/10

L4CHA1 MOD 0/10 PER 10/10 MODPER 0/10

L4CHA2 MOD 0/10 PER 4/10 MODPER 0/10

L4ANI1 MOD /10 PER /10 MODPER /10

L4ANI2 MOD /10 PER /10 MODPER /10

LOCATION 5

L5LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L5CONT (# OF OBJECTS) 0

L5DESC MOD 0/10 PER 2/10 MODPER 0/10

L5OB1 MOD /10 PER /10 MODPER /10

L5OB2 MOD /10 PER /10 MODPER /10

L5CHA1 MOD /10 PER /10 MODPER /10

L5CHA2 MOD /10 PER /10 MODPER /10

L5ANI1 MOD /10 PER /10 MODPER /10

L5ANI2 MOD /10 PER /10 MODPER /10

LOCATION 6

L6LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L6CONT (# OF OBJECTS) 2

L6DESC MOD 0/10 PER 2/10 MODPER 0/10

L6OB1 MOD 0/10 PER 3/10 MODPER 0/10

L6OB2 MOD 0/10 PER 3/10 MODPER 0/10

L6CHA1 MOD /10 PER /10 MODPER /10

L6CHA2 MOD /10 PER /10 MODPER /10

L6ANI1 MOD /10 PER /10 MODPER /10

L6ANI2 MOD /10 PER /10 MODPER /10

LOCATION 7

L7LIGHT MOD 0/1 PER 1/1 MODPER 0/1

L7CONT (# OF OBJECTS) 4

L7DESC MOD 9/10 PER 2/10 MODPER 9/10

L7OB1 MOD 0/10 PER 3/10 MODPER 0/10

L7OB2 MOD 0/10 PER 3/10 MODPER 0/10

L7CHA1 MOD 0/10 PER 10/10 MODPER 0/10

L7CHA2 MOD 0/10 PER 4/10 MODPER 0/10

L7ANI1 MOD /10 PER /10 MODPER /10

L7ANI2 MOD /10 PER /10 MODPER /10

FINAL SCORES

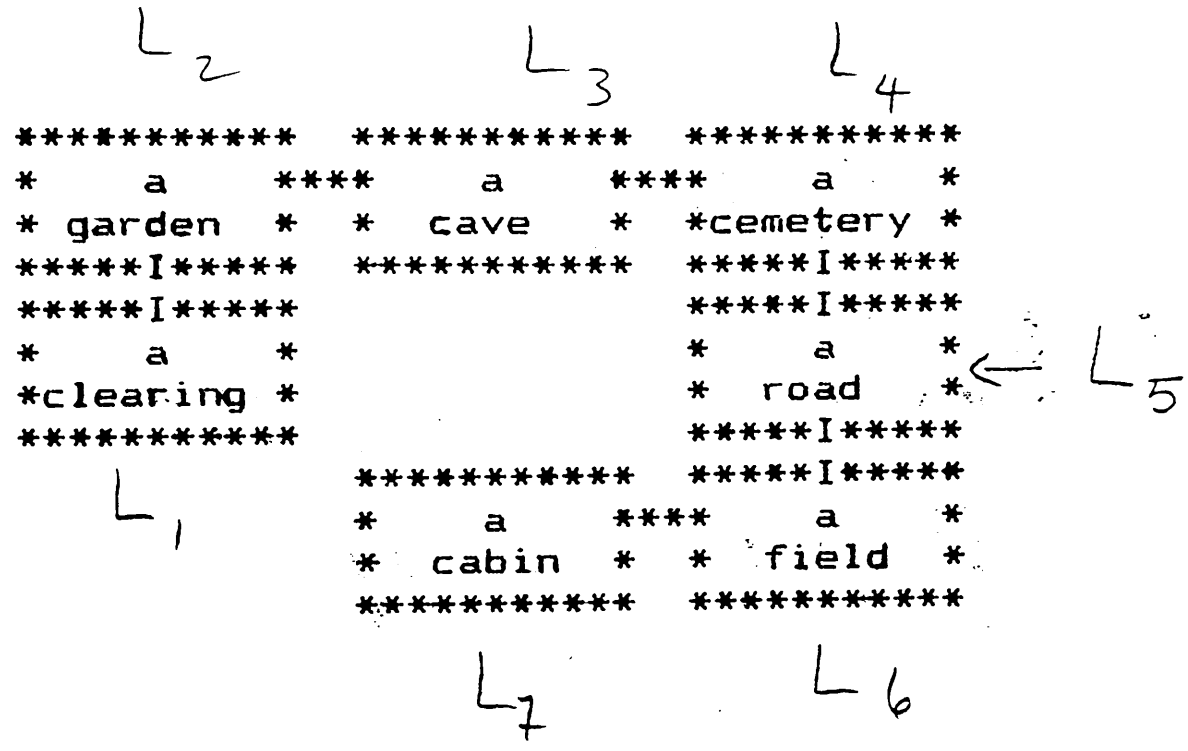
TOTAL % MOD 5 /100

TOTAL % PER 85 /100

TOTAL % MODPER 5/100

Your a traveler trying to get out of the jungle and get back to your house.

----------GEOGRAPHY----------



----------DESCRIPTION----------

There's no treasure to be found in this adventure.
A plain old clearing.
In the clearing you see ...
  A plain old stone.
  A brave, young adventurer.
You're not carrying anything.

L1

A plain old garden.
In the garden you see ...
  A plain old plant.
  A plain old boulder.
  A plain old flashlight.

L2

A plain old cave.
It's pitch black inside the cave.
In the cave you see ...
  A skeleton key.

L3

A plain old cemetery.
In the cemetery you see ...
  A plain old plant.
  A plain old stone.
  A plain old pit.
  A strange character.
  The sorcerer is not carrying anything.

L4

A plain old road.
There is nothing in the road.

A plain old field.
In the field you see ...
A plain old plant.
A plain old stone.

A tiny log cabin.
In the cabin you see ...
A plain old table.
There isn't anything on the table.
There isn't anything under the table.
A plain old chair.
There isn't anything on the chair.
There isn't anything under the chair.
A cot.
There isn't anything on the bed.
There isn't anything under the bed.
There is nothing in the bed.
A strange character.
The woman is not carrying anything.

EVALUATION GRID

LOCATION 1

LOCNUMB 7

L1LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L1CONT (# OF OBJECTS) 2

L1DESC	MOD	9/10	PER	2/10	MODPER	0/10
L1HERO	MOD	1/10	PER	3/10	MODPER	0/10
L1OB1	MOD	9/10	PER	3/10	MODPER	0/10
L1OB2	MOD	/10	PER	/10	MODPER	/10
L1CHA1	MOD	/10	PER	/10	MODPER	/10
L1CHA2	MOD	/10	PER	/10	MODPER	/10
L1ANI1	MOD	/10	PER	/10	MODPER	/10
L1ANI2	MOD	/10	PER	/10	MODPER	/10

LOCATION 2

L2LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L2CONT (# OF OBJECTS) 2

L2DESC	MOD	9/10	PER	2/10	MODPER	0/10
L2OB1	MOD	0/10	PER	0/10	MODPER	0/10
L2OB2	MOD	0/10	PER	3/10	MODPER	0/10
L2CHA1	MOD	/10	PER	/10	MODPER	/10
L2CHA2	MOD	/10	PER	/10	MODPER	/10

L2ANI1 MOD /10 PER /10 MODPER /10

L2ANI2 MOD /10 PER /10 MODPER /10

LOCATION 3

L3LIGHT MOD 0/1 PER 1/1 MODPER 0/1

L3CONT (# OF OBJECTS) 1

L3DESC MOD 0/10 PER 2/10 MODPER 0/10

L3OB1 MOD 1/10 PER 3/10 MODPER 0/10

L3OB2 MOD /10 PER /10 MODPER /10

L3CHA1 MOD /10 PER /10 MODPER /10

L3CHA2 MOD /10 PER /10 MODPER /10

L3ANI1 MOD /10 PER /10 MODPER /10

L3ANI2 MOD /10 PER /10 MODPER /10

LOCATION 4

L4LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L4CONT (# OF OBJECTS) 1

L4DESC MOD 0/10 PER 2./10 MODPER 0/10

L4OB1 MOD 0/10 PER 3/10 MODPER 0/10

L4OB2 MOD /10 PER /10 MODPER /10

L4CHA1 MOD /10 PER /10 MODPER /10

L4CHA2 MOD /10 PER /10 MODPER /10

L4ANI1 MOD /10 PER /10 MODPER /10

L4ANI2 MOD /10 PER /10 MODPER /10

LOCATION 5

L5LIGHT MOD 0/1 PER 1/1 MODPER 0/1

L5CONT (# OF OBJECTS) 4

L5DESC MOD0 /10 PER 2/10 MODPER 0/10

L5OB1 MOD 0/10 PER 3/10 MODPER 0/10

L5OB2 MOD 0/10 PER 3/10 MODPER 0/10

L5CHA1 MOD 2/10 PER 8/10 MODPER 1/10

L5CHA2 MOD 0/10 PER 3/10 MODPER 0/10

L5ANI1 MOD /10 PER /10 MODPER /10

L5ANI2 MOD /10 PER /10 MODPER /10

LOCATION 6

L6LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L6CONT (# OF OBJECTS) 1

L6DESC MOD 9/10 PER 2/10 MODPER 0/10

L6HERO MOD 0/10 PER 3/10 MODPER 0/10

L6OB1 MOD /10 PER /10 MODPER /10

L6OB2 MOD /10 PER /10 MODPER /10

L6CHA1 MOD /10 PER /10 MODPER /10

L6CHA2 MOD /10 PER /10 MODPER /10

L6ANI1 MOD /10 PER /10 MODPER /10

L6ANI2 MOD /10 PER /10 MODPER /10

LOCATION 7

L7LIGHT MOD 1/1 PER 1/1 MODPER 1/1

L7CONT (# OF OBJECTS) 1

L7DESC MOD 0/10 PER 2/10 MODPER 0/10

L7OB1 MOD 9/10 PER 3/10 MODPER 0/10

L7OB2 MOD /10 PER /10 MODPER /10

L7CHA1 MOD /10 PER /10 MODPER /10

L7CHA2 MOD /10 PER /10 MODPER /10

L7ANI1 MOD /10 PER /10 MODPER /10

L7ANI2 MOD /10 PER /10 MODPER /10

FINAL SCORES

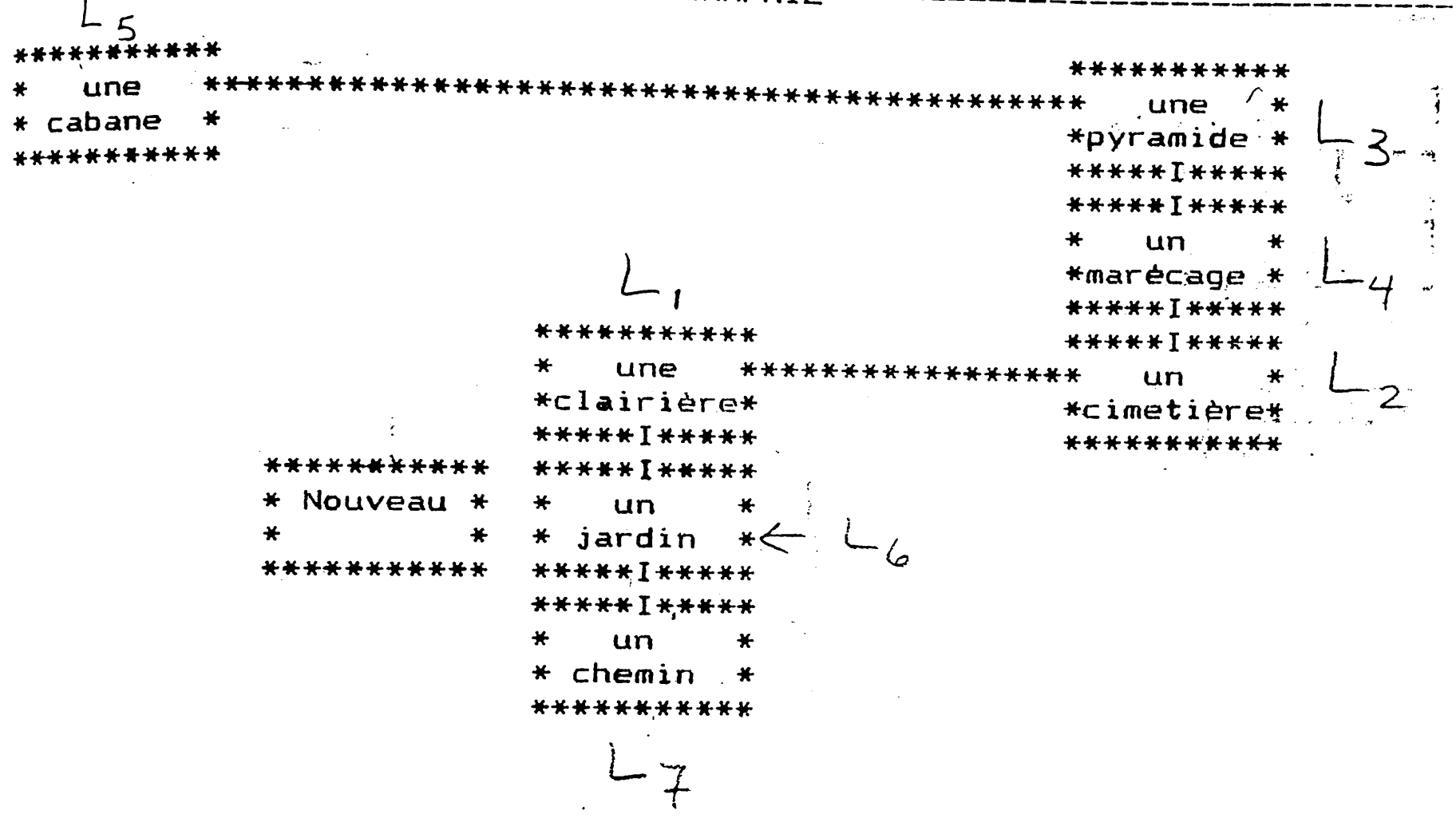
TOTAL % MOD 9/100

TOTAL % PER 59/100

TOTAL % MODPER 6/100

Je suis une aventuriere et je recherche le parchemin magique.

----------GEOGRAPHIE----------



----------DESCRIPTION----------

Il n'y a aucun trésor à découvrir dans cette aventure.
Une jolie petite clairière.
Dans la clairière il y a ...
  Une jolie petite fleur.
  Une aventuriere jeune et vaillante.
Tu n'as rien sur toi.

Un vieux cimetière en ruine.
Dans le cimetière il y a ...
  Une fosse peu profonde.
  Dans la fosse il y a ...
    Un squelette.
  Une table bien ordinaire.
    Il n'y a rien sur la table.
    Il n'y a rien sous la table.

Une mystérieuse pyramide en pierre.
Dans la pyramide il y a ...
  Un parchemin magique.
  Il y a quelque chose d'écrit sur le parchemin.
  Tu peux y lire: 'Les formules magiques.'.

Un marécage étrange et silencieux.
Dans le marécage il y a ...

Un sable mouvant bien ordinaire.
Sur le sable mouvant tu vois ... 1067
Une liane bien ordinaire.

107

Une petite cabane très simple.
Dans la cabane il y a ...
Une table bien ordinaire.
Il n'y a rien sur la table.
Il n'y a rien sous la table.
Une chaise bien ordinaire.
Il n'y a rien sur la chaise.
Il n'y a rien sous la chaise.
Un lit de camp.
Il n'y a rien sur le lit.
Il n'y a rien sous le lit.
Il n'y a rien dans le lit.
Un missionnaire.
Le missionnaire possède ...
Une carte bien ordinaire.
Il y a quelque chose d'écrit sur la carte.
Tu peux y lire: 'L'endroit où se trouve le parchemin.'

Un joli jardin.
Dans le jardin il y a ...
Une plante bien ordinaire.

Un long chemin sans végétation.
Dans le chemin il y a ...
Un rocher bien ordinaire.

EVALUATION GRID

LOCATION 1

LOCNUMB 7

L1LIGHT MOD 1 /1 PER 1 /1 MODPER 1 /1

L1CONT (# OF OBJECTS) 2

L1DESC MOD 0/10 PER 7/10 MODPER 0/10

L1HERO MOD 0/10 PER 3/10 MODPER 0/10

L1OB1 MOD 0/10 PER 3/10 MODPER 0/10

L1OB2 MOD /10 PER /10 MODPER /10

L1CHA1 MOD /10 PER /10 MODPER /10

L1CHA2 MOD /10 PER /10 MODPER /10

L1ANI1 MOD /10 PER /10 MODPER /10

L1ANI2 MOD /10 PER /10 MODPER /10

LOCATION 2

L2LIGHT MOD 1 /1 PER 1 /1 MODPER 1 /1

L2CONT (# OF OBJECTS) 3

L2DESC MOD 0/10 PER 7/10 MODPER 0/10

L2OB1 MOD 0/10 PER 3/10 MODPER 0/10

L2OB2 MOD 0/10 PER 3/10 MODPER 0/10

L2CHA1 MOD 0/10 PER 3/10 MODPER 0/10

L2CHA2 MOD /10 PER /10 MODPER /10

L2ANI1 MOD /10 PER /10 MODPER /10

L2ANI2 MOD /10 PER /10 MODPER /10

LOCATION 3

L3LIGHT MOD 0/1 PER 1/1 MODPER 0 /1

L3CONT (# OF OBJECTS) 1

L3DESC MOD 0/10 PER 2/10 MODPER 0/10

L3OB1 MOD 0/10 PER 3 /10 MODPER 0 /10

L3OB2 MOD /10 PER /10 MODPER /10

L3CHA1 MOD /10 PER /10 MODPER /10

L3CHA2 MOD /10 PER /10 MODPER /10

L3ANI1 MOD /10 PER /10 MODPER /10

L3ANI2 MOD /10 PER /10 MODPER /10

LOCATION 4

L4LIGHT MOD 1/1 PER 1 /1 MODPER 1 /1

L4CONT (# OF OBJECTS) 4

L4DESC MOD 0/10 PER 2/10 MODPER 0/10

L4OB1 MOD 0/10 PER 3/10 MODPER 0/10

L4OB2 MOD 2/10 PER 3/10 MODPER 1/10

L4CHA1 MOD 3/10 PER 10 10 MODPER 2/10

L4CHA2 MOD 0/10 PER 4/10 MODPER 0/10

L4ANI1 MOD /10 PER /10 MODPER /10

L4ANI2 MOD /10 PER /10 MODPER /10

LOCATION 5

L5LIGHT MOD 0/1 PER 1/1 MODPER 0/1

L5CONT (# OF OBJECTS) 0

L5DESC MOD 0/10 PER 2/10 MODPER 0/10

L5OB1 MOD /10 PER /10 MODPER /10

L5OB2 MOD /10 PER /10 MODPER /10

L5CHA1 MOD /10 PER /10 MODPER /10

L5CHA2 MOD /10 PER /10 MODPER /10

L5ANI1 MOD /10 PER /10 MODPER /10

L5ANI2 MOD /10 PER /10 MODPER /10

LOCATION 6

L6LIGHT MOD 1 /1 PER 1 /1 MODPER 1 /1

L6CONT (# OF OBJECTS) 2

L6DESC MOD 0/10 PER 3/10 MODPER 0/10

L6OB1 MOD 1/10 PER 3/10 MODPER 1/10

L6OB2 MOD /10 PER /10 MODPER /10

L6CHA1 MOD /10 PER /10 MODPER /10

L6CHA2 MOD /10 PER /10 MODPER /10

L6ANI1 MOD /10 PER /10 MODPER /10

L6ANI2 MOD /10 PER /10 MODPER /10

LOCATION 7

L7LIGHT MOD 1 /1 PER 1 /1 MODPER 1 /1

L7CONT (# OF OBJECTS) 4

L7DESC MOD 0 /10 PER 2 /10 MODPER 0 /10

L7OB1 MOD 0 /10 PER 3 /10 MODPER 0 /10

L7OB2 MOD 0 /10 PER 2 /10 MODPER 0 /10

L7CHA1 MOD 2 /10 PER 10 /10 MODPER 2 /10

L7CHA2 MOD 0 /10 PER 5 /10 MODPER 0 /10

L7ANI1 MOD /10 PER /10 MODPER /10

L7ANI2 MOD /10 PER /10 MODPER /10

FINAL SCORES

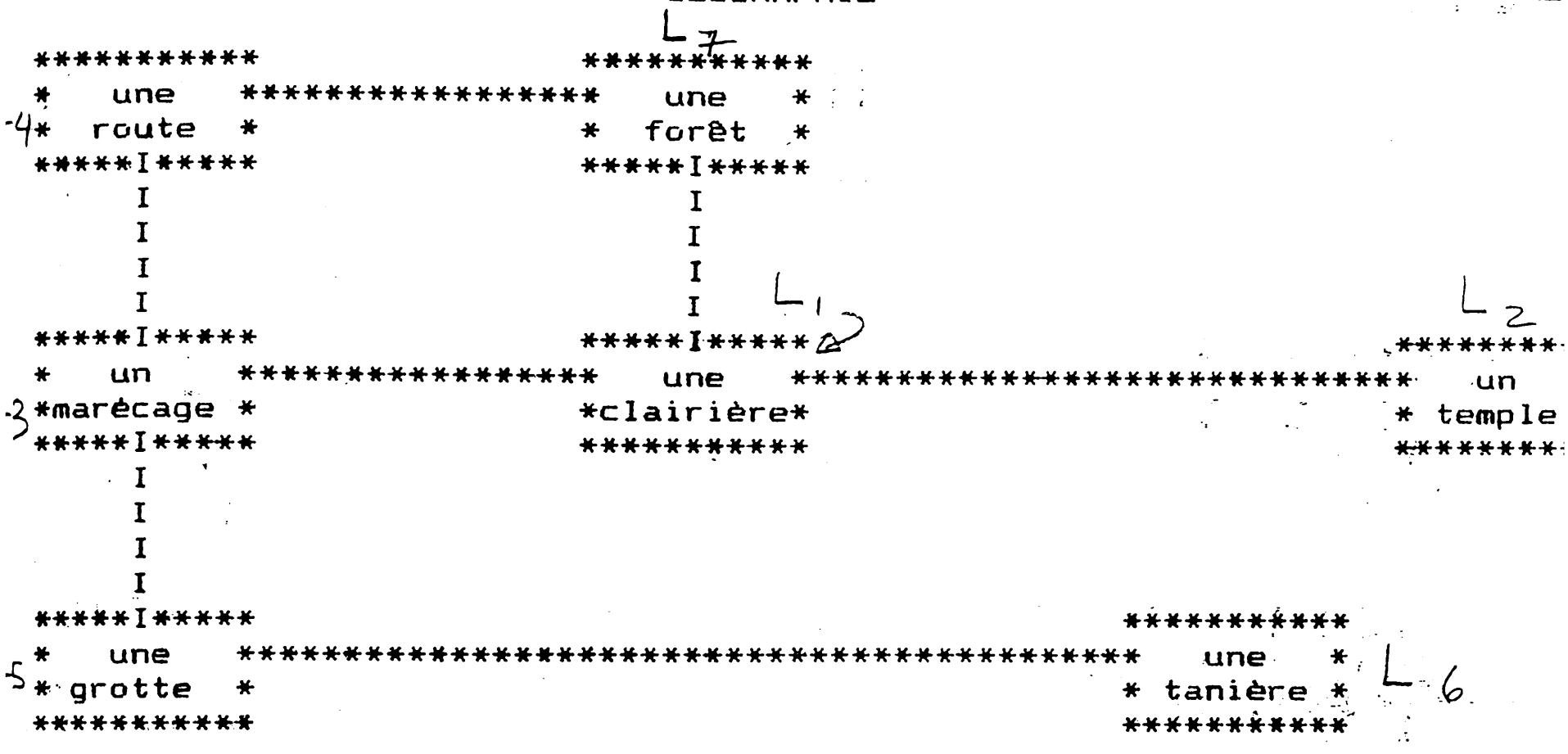
TOTAL % MOD 13 /100

TOTAL % PER 84 /100

TOTAL % MODPER 11 /100

Je suis un agent-double qui dois detruire une carte

----------GEOGRAPHIE----------



----------DESCRIPTION----------

Il n'y a aucun trésor à découvrir dans cette aventure.
Une jolie petite clairière.
Dans la clairière il y a ...
   Une plante bien ordinaire.
   Une pierre bien ordinaire.
   Je suis un agent-double jeune et vaillant.
   Tu possèdes ...
      Un fouet bien ordinaire.
      Une lampe de poche bien ordinaire.

Un temple étrange et envoûtant.
Dans le temple il y a ...
   Une grosse araignée velue.
   L'araignée n'a rien sur elle.

Un marécage étrange et silencieux.
Dans le marécage il y a ...
   Un sable mouvant bien ordinaire.
      Sur le sable mouvant tu vois ...
         Une liane bien ordinaire.

Une large route chaotœuse.
Dans la route il y a ...
   Une oelle bien ordinaire.

Une grotte sombre et peu invitante.
Dans la grotte il y a ...
   Une clé en bronze un peu tordue.

Une sombre tanière de fauve.
L'obscurité est totale dans la tanière.
Dans la tanière il y a ...
   Un coffre bien ordinaire.
      Sur le coffre tu vois ...
         Une sacoche bien ordinaire.
         Dans la sacoche il y a ...
            Un couteau bien ordinaire.
   Dans le coffre il y a ...
      Une carte bien ordinaire.
      Il y a quelque chose d'écrit sur la carte.
      Tu peux y lire: 'S.O.S'.

Une forêt bien ordinaire.
Dans la forêt il y a ...
   Une jolie petite fleur.
   Un arbre bien ordinaire.
      Il n'y a rien dans l'arbre.
   Un arbre bien ordinaire.
      Il n'y a rien dans l'arbre.
   Un sorcier grand et fort.
   Le sorcier n'a rien sur lui.

Key for Abbreviations in the Evaluation Grid

1. LOCNUMB: number of locations in the adventure plan.
2. L1LIGHT, L2LIGHT,...L8LIGHT: available light in location 1, location 2,...location 8.
3. L1CONT, L2CONT,... L8CONT: number of objects in location 1, location 2,...location 8.
4. L1DESC, L2DESC, L8DESC: description of location 1, location 2,...location 8.
5. L1HERO: hero in the adventure plan.
6. L1OB1, L2OB1,...L8OB1: first object in location 1, location 2,...location 8.
7. L1OB2, L2OB2,...L8OB2: second object in location 1, location 2,...location 8.
8. L1CHA1, L2CHA1,...L8CHA1: first character in location 1, location 2,...location 8.
9. L1CHA2, L2CHA2,...L8CHA2: second character in location 1, location 2,...location 8.
10. L1ANI1, L2ANI1,...L8ANI1: first animal in location 1, location 2,...location 8.
11. L1ANI2, L2ANI2,...L8ANI2: second animal in location 1, location 2,...location 8.

12. **MOD:** percentage of modification of items (light, number of objects, description, hero, object, character or animal).
13. **PER:** percentage of pertinence of items (light, number of objects, description, hero, object, character or animal).
14. **MODPER:** percentage of pertinent modification of items (light, number of objects, description, hero, object, character or animal).