

Assignment 2 – Escape Game

This assignment asks you to write a simple game akin to old text adventure games like Adventure:

http://en.wikipedia.org/wiki/Colossal_Cave_Adventure 

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This program will introduce you to programming in C on UNIX based systems and will get you familiar with reading and writing files.

Overview

Your program will first create a series of files that hold descriptions of the rooms and how rooms are connected, and then it will offer the player an interface for playing the game using those generated rooms.

The player will begin in the “starting room” and will win the game automatically upon entering the “ending room”.

Finally, the program will exit and display the path taken by the player.

Specifications

The first thing your program must do is generate 7 different rooms in a directory called `<username>.rooms.<process id>`. For example, the directory, if I was writing the program, should be hard-coded (except for the process id number), as: `pkalatha.rooms.19903`

Each room has a Room Name, at least 3 connections and at most 6 connections from this room to other rooms (the number of connections should be random), and a room type. The connections from one room to the others should be randomly assigned – i.e. which rooms connect to each other one is random - but note that if room A connects to room B, then room B must have a connection back to room A. There must be at least one connected path from the start room to the end room (described below).

The file that stores each room must have exactly this form, where the ... is additional room connections, as randomly generated:

ROOM NAME: *<room name>*

CONNECTION 1: *<room name>*

...

ROOM TYPE: *<room type>*

Choose a list of ten different room names, hard coded into your program, and have your program randomly assign a room name to each room generated. For a given run of your program, a room name cannot be used to generate more than one room.

The possible room type entries are: START_ROOM, END_ROOM, and MID_ROOM. The assignment of which room gets which type should be random. Naturally, only one room should be assigned as the start room, and only one room should be assigned as the end room.

Here are the contents of files representing three sample rooms from a full set of room files. My list of room names includes the following, among others: XYZZY, PLUGH, PLOVER, twisty, Zork, Crowther, and Dungeon.

ROOM NAME: XYZZY
CONNECTION 1: PLOVER
CONNECTION 2: Dungeon
CONNECTION 3: twisty
ROOM TYPE: START_ROOM

ROOM NAME: twisty
CONNECTION 1: PLOVER
CONNECTION 2: XYZZY
CONNECTION 3: Dungeon
CONNECTION 4: PLUGH
ROOM TYPE: MID_ROOM

... (Other rooms) ...

ROOM NAME: Dungeon
CONNECTION 1: twisty
CONNECTION 2: PLOVER
CONNECTION 3: XYZZY
CONNECTION 4: PLUGH
CONNECTION 5: Crowther
CONNECTION 6: Zork
ROOM TYPE: END_ROOM

The ordering of the connections from one room to the other rooms, in the file, does not matter.

Now let's describe what should be presented to the player. Upon being executed, after the rooms are generated, the game should present an interface to the player. Note that the room data must be read back into the program from the files, for use by the game. You can either do all of this reading immediately after writing them or read each file as needed in the course of the game.

This interface should list where the player current is and list the possible connections that can be followed. It should also then have a prompt. Here is the form that must be used:

CURRENT LOCATION: XYZZY
POSSIBLE CONNECTIONS: PLOVER, Dungeon, twisty.
WHERE TO? >

The cursor should be placed just after the > sign. Note the punctuation used: colons on the first two lines, commas on the second line, and the period on the second line. All are required.

When the user types in the exact name of a connection to another room (Dungeon, for example), and then hits return, your program should write a new line, and then continue running as before. For example, if I typed twisty above, here is what the output should look like:

```
CURRENT LOCATION: XYZZY  
POSSIBLE CONNECTIONS: PLOVER, Dungeon, twisty.  
WHERE TO? >twisty
```

```
CURRENT LOCATION: twisty  
POSSIBLE CONNECTIONS: PLOVER, XYZZY, Dungeon, PLUGH.  
WHERE TO? >
```

If the user types anything but a valid room name from this location (case matters!), the program should return an error line that says "HUH? I DON'T UNDERSTAND THAT ROOM. TRY AGAIN.", and repeat the current location and prompt, as follows:

```
CURRENT LOCATION: XYZZY  
POSSIBLE CONNECTIONS: PLOVER, Dungeon, twisty.  
WHERE TO? >Twisty
```

```
HUH? I DON'T UNDERSTAND THAT ROOM. TRY AGAIN.
```

```
CURRENT LOCATION: XYZZY  
POSSIBLE CONNECTIONS: PLOVER, Dungeon, twisty.  
WHERE TO? >
```

Trying to go to an incorrect location does not increment the path history or the step count. Once the user has reached the End Room, the program should indicate that it has been reached. It should also print out the path the user has taken to get there, the number of steps, and a congratulatory message. Here is a complete game example, showing the winning messages and formatting, and the return to the prompt:

```
CURRENT LOCATION: XYZZY  
POSSIBLE CONNECTIONS: PLOVER, Dungeon, twisty.  
WHERE TO? >Twisty
```

```
HUH? I DON'T UNDERSTAND THAT ROOM. TRY AGAIN.
```

```
CURRENT LOCATION: XYZZY  
POSSIBLE CONNECTIONS: PLOVER, Dungeon, twisty.  
WHERE TO? >twisty
```

CURRENT LOCATION: twisty

POSSIBLE CONNECTIONS: PLOVER, XYZZY, Dungeon, PLUGH.

WHERE TO? >Dungeon

YOU HAVE FOUND THE END ROOM. CONGRATULATIONS!

YOU TOOK 2 STEPS. YOUR PATH TO VICTORY WAS:

twisty

Dungeon

%

Note the punctuation used: I expect the same punctuation in your program.

What you'll submit is your program, named `<username>.adventure.c`. It will be compiled using this line, with my username as the example:

```
%gcc -o pkalatha.adventure pkalatha.adventure.c
```

When your program exits, set the error code to 0, and leave the rooms directory in place, so that it can also be examined.

If you need to use temporary files, place them in the directory you create above. Do not leave any behind once your program is finished. We will not test for early termination of your program, so you don't need to watch for those signals.

Hints

You'll need to figure out how to get C to read input from the keyboard and pause until input is received. I recommend you use the `fgets()` function. You'll also get the chance to become proficient in reading and writing files. You may use either the older `open`, `close`, `lseek` method of manipulating files, or the `STDIO` standard input library methods that use `fopen`, `fclose`, and `fseek`.

Grading

You should be warned that if your program doesn't compile or doesn't generate room files on execution, you'll receive a zero for the grade.

80% of your grade will be based on how well you adhere to the specifications above.

20% of your grade will be based on your style, readability, and commenting.