

COM S 3270, Spring 2025

Programming Project 1.05

User Interface with Ncurses

Last week we added some characters, and made them move around and smite one another. You may have added some code to drive your @. You can rip that code out, now¹. We're going to add a user interface that you can use to drive your @ manually. If you like, you can leave the auto-drive code in there and add a command to turn it on and off at runtime.

Still working in C, link in the ncurses library and use it for unbuffered I/O.

We're going to make our stairs functional now, too. When the PC goes up or down a staircase, a new dungeon is generated and populated with the PC and new monsters. An upward staircase is represented with <; a downward staircase with >. The PC uses stairs by entering the appropriate stair command (see below) while standing on the staircase. NPCs cannot use stairs, not even the smart ones. Stairs provide an important means of escape for PCs.

It's up to you whether levels persist or disappear. In most roguelike games, every staircase leads to a new, random dungeon (e.g., if you go down then back up, you will *not* return to the place that you just left). Persistent levels (down and up *does* return you to your old position) are harder to implement than non-persistent, but not significantly so.

It's also up to you whether or not you implement "connected stairs". That is, if you go down a staircase, are you left standing on an up staircase?

As for user input, all commands are to be activated immediately upon key-press. There is never a need to hit enter. Any command which is not explicitly defined is a no-op. Implement the following commands:

Key(s)	Action
7 or y	Attempt to move PC one cell to the upper left.
8 or k	Attempt to move PC one cell up.
9 or u	Attempt to move PC one cell to the upper right.
6 or l	Attempt to move PC one cell to the right.
3 or n	Attempt to move PC one cell to the lower right.
2 or j	Attempt to move PC one cell down.
1 or b	Attempt to move PC one cell to the lower left.
4 or h	Attempt to move PC one cell to the left.
>	Attempt to go down stairs. Works only if standing on down staircase.
<	Attempt to go up stairs. Works only if standing on up staircase.
5 or space or .	Rest for a turn. NPCs still move.
m	Display a list of monsters in the dungeon, with their symbol and position relative to the PC (e.g.: "c, 2 north and 14 west").
up arrow	When displaying monster list, if entire list does not fit in screen and not currently at top of list, scroll list up.
down arrow	When displaying monster list, if entire list does not fit in screen and not currently at bottom of list, scroll list down.
escape	When displaying monster list, return to character control.
Q	Quit the game.

¹If you gave your PC any special powers, like the ability to tunnel through walls, those should no longer apply, either; your PC is a normal human, save that he or she may be abnormally foolish.

With these changes, we no longer need the delay that we built in last week; the game will now pause automatically for input. And ncurses should handle the redrawing, so we're no longer spewing the entire dungeon to the terminal each turn. Things will look much nicer.

Note that the keys y, k, u, l, n, j, b, and h are not as strange or arbitrary as they may initially appear. vi and vim users will immediately recognize these as the cursor movement keys in their editor. They're also used in many roguelike games (including the original Rogue and most of its direct descendants).

Our dungeons fill 21 out of 24 lines in a terminal. Display them on lines 1–21 (zero indexed). The top line is for message display. Use it to display any messages you like (like debugging information, or information about why a command can't be executed ("There's a wall in the way!")). The bottom 2 lines are for status information, which we'll deal with in a later assignment.

You may add any other commands that you like, or map the required commands to additional keys, as long as you implement the specified mappings. Below is a complete list of commands that we will implement (both required and extra commands that I implement but which are not required) in this and future assignments. You should consider all of these specified keys "reserved" (i.e., don't use them for your commands, or you'll eventually have to change them). Any key that is not specified below is available for you to use however you'd like.

KEY_HOME	Move up-left	d	Drop item
KEY_UP	Move up	e	Display equipment
KEY_PPAGE	Move up-right	f	Toggle "fog of war"
KEY_RIGHT	Move right	g	Teleport (goto)
KEY_NPAGE	Move down-right	h	Move left
KEY_KEY_DOWN	Move down	i	Display inventory
KEY_END	Move down-left	j	Move down
KEY_LEFT	Move left	k	Move up
KEY_B2	Rest	l	Move right
space	Rest	m	Display monster list
>	Go down stairs	n	Move down-right
<	Go up stairs	s	Display the default (terrain) map
.	Rest	t	Take off item
1	Move down-left	u	Move up-right
2	Move down	w	Wear item
3	Move down-right	x	Expunge item
4	Move left	y	Move up-left
5	Rest	D	Display the non-tunneling distance map
6	Move right	E	Inspect equipped item
7	Move up-left	H	Display the hardness map
8	Move up	I	Inspect inventory item
9	Move up-right	L	Look at monster
b	Move down-left	Q	Quit the game
c	Display character information	T	Display the tunneling distance map