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CS 162/400
Project 1 (Design + Reflection)

Menu Design: (Output displayed in bold lettering)

Langston's Ant Simulation **by Matthew Solbrack**

Menu
1. Start Langston's Ant simulation
2. Quit

Please choose one option from above: _

(option 1) – Brings you to the next step.
(option 2) – Display's a message and exit's the program
Thanks for stopping by!
exit
(error) – Input not correct
Try Again: _
-or-
Please enter either 1 or 2 (then the main menu will reappear)

Next Step (Extra Credit):

Would you like a random starting location? (Y/N): _

(option Y) – continue without asking for a starting location
(option N) – continue with asking for a starting location
(error) – redisplays the question after this message:
Please enter Y or N only!

Next Step (Choices):

How many rows would you like on the board? _
How many columns would you like on the board? _
How many steps would you like to play? _
What row would you like to start on? _ (only if random wasn't picked)
What column would you like to start on? _ (only if random wasn't picked)

For the starting point, if outside the bounds of rows or columns
Please pick a number between 1 and <row/column max> : _

Next Step (Display Board and starting location):

Starting location: (row 2, column 4)

```
  1  2  3  4  5
1
2        *
3
4
5
```

Next Step (Display each step in the simulation):

Step 2:

```
  1  2  3  4  5
1
2        #  *
3
4
5
```

Step 3:

```
  1  2  3  4  5
1           *
2        #  #
3
4
5
```

Next Step (Back to the menu for further directions):

Menu
1. Play again
2. Quit

Test Table

Test Case	Input Values	Expected Outcomes	Observed Outcomes
Input Negative	-1, -22, -5	"Try Again" or Brings you back to the original menu or question	"Try Again"
Input at 0	0	"Try Again"	"Try Again"
Input in Current Range	1,10,15	Should go through the program and bring you to the menu to run the simulation again.	For the 1 input some of the prompts asked for a number bigger than 2 because the simulation doesn't work well with numbers this small.
Input low	2, 3, 4, 5.5	Should go through the program and bring you to the menu to run the simulation again.	For the 1 input some of the prompts asked for a number bigger than 2 because the simulation doesn't work well with numbers this small. For 5.5 the program ran but the questions were jumbled.
input extremely High	1000, 99, 55	Should go through the program and bring you to the menu to run the simulation again.	the 1000 was not great. the program ran but it took a really long time and the data looked a bit jumbled. But, the program still seemed to run.
other than integer	#, W,	"Try Again"	"Try Again"

Reflection

Wow. This was a difficult project. The initial design worked well, but the backend to make it work was time consuming. The only major difference from the design to the actual program was the addition of the Ant orientation. I thought it was a good idea to add, to each step, the ant orientation (north/south or west/east).

One of the most time-consuming things about this project, for me, was the decision to separate the ant class and the board. I started writing the code with separate classes. I couldn't figure out how to keep track of the ant in a separate class from the board. I tried pointer arrays but couldn't get it quite work right. So, I decided to make the board and the ant in the same class. It came together quickly after making that decision.

This project has taught me one major thing, if you get stuck on a problem, work on something else! I tried to power through sometimes and I just ended up going in circles. So many hours were wasted on this.

I also learned how to generate random numbers in-between two integers. That was thanks to a quick internet search.

Overall, I am happy with the result of this project. This is the largest program I have built to date. It was challenging and fun at the same time.