

## CS 177 – Project #3

Spring 2018

### Due Date

This assignment is due by **11:59 pm on Monday, April 30** and must be submitted to Blackboard

### Team Project

This project is a team assignment – you should complete it with your assigned CS 177 team members and not on your own. Every team member should submit the identical completed `project3.py` program by the due date. Late submissions are not accepted.

This assignment is a continuation of *Project 2*. Work with your team members to ensure you are starting with a program containing all the functionality specified in *Project 2* before proceeding with **Project 3**.

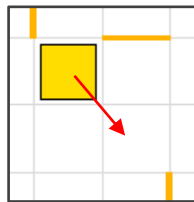
### Assignment Description: Enhancing the BoilerMazer Game

The entire Purdue campus is buzzing about the CS 177 BoilerMazer game prototypes. In fact, they've practically begged you to expand the current version and have provided dozens of great ideas for features, enhancements and improvements. To address the demand, you've been asked to add three (3) specific new game features and to develop three (3) creative features of your own. A description of the assignment follows:

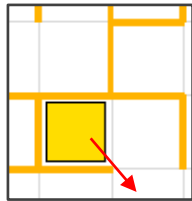
- **Diagonal Movement:** The new simulator should allow users to move diagonally in addition to horizontally and vertically through the maze. This changes the scoring element of the game since Pete can potentially cross more than one sensor in a single move.
- **Black Holes:** Two squares on the grid, (marked with small black circles), act as 'black holes' and can instantly transport Pete across the board without changing his score.
- **Continuous Scrolling Top Scores Display:** A redesign of the Game Control panel allows the full contents of the `top_scores.txt` file to be continuously displayed in a scrolling box. No longer just the best 4 scores, all scores can be viewed.
- **Custom Creative Additions:** Your team must develop, fully document, test and implement three (3) additional, creative features for the BoilerMazer game based on your own design. You are free to design and add whatever you can imagine, however it must be an addition or enhancement to the existing Project specifications. Your creative features may not replace or interfere with the existing requirements.

### Part 1: Diagonal Movement

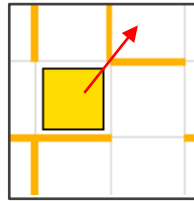
Modify your BoilerMazer program to allow Pete to move one space diagonally as well as horizontally and vertically. For example, a click detected any distance down and to the right of Pete would result in Pete moving one grid down and to the right. A click any distance up and to the left would result in Pete moving one grid up and to the left. In general, movement would still result in one (1) point added to the player's score.



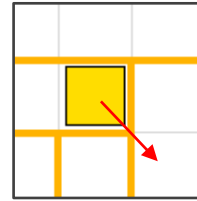
No sensors  
1 point move



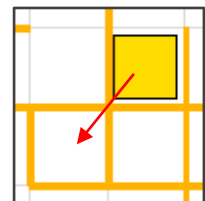
One sensor  
3 point move



Two sensors  
6 point move



Three sensors  
9 point move



Four sensors  
12 point move

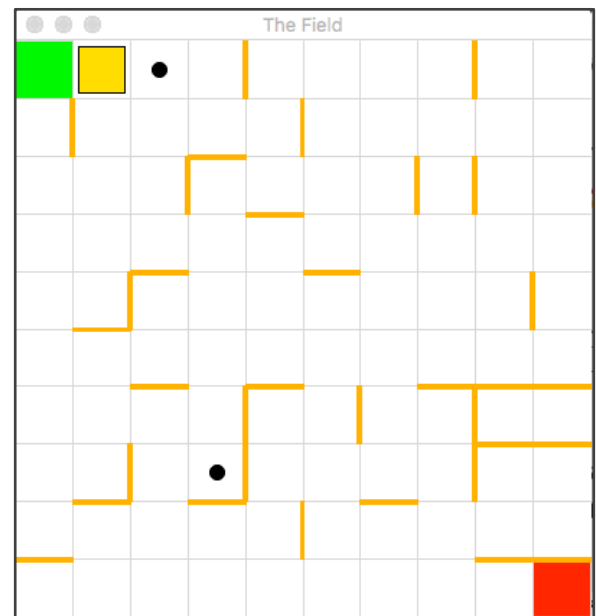
As in the original *Project 2* specifications, movements that result in Pete crossing sensors result in 3 points added to the player's score. Diagonal movements make this slightly more complex as Pete may cross multiple sensors in a single move. (See the examples shown)

### Part 2: Black Holes in Random Grids

When a new game starts and the field is drawn, two black Circles (*radius 5*) should be placed in the center of random grid locations. These represent *Black Holes* which will instantly transport (*move*) Pete from one marked grid location to the other. Movement through the Black Hole does not change the player's score.

### Part 3: Continuous Scrolling Top Scores Display

Adjust the size of the Game Panel to allow the *Top Scores* display to be visible at all times. Change the Top Scores display to continuously scroll the names from the `top_scores.txt` file when the program is running. When a player completes a game and their names are added to the `top_scores.txt` file, they should also be added to the scrolling display in ascending order (*lowest score first*). The scores will scroll at all times -- *even while a player is navigating the maze*.



'Black Holes' shown in the BoilerMazer grid

Instead of displaying only top four scores, the continuous scrolling scores display will show all scores from the save file, although only four will be visible at any given time. See examples below.

<p>TOP SCORES</p> <p>BigMac 12 ShMac 15 VicMac 19 LittleT 21</p>	<p>TOP SCORES</p> <p>ShMac 15 VicMac 19 LittleT 21 Chi 23</p>	<p>TOP SCORES</p> <p>VicMac 19 LittleT 21 Chi 23 BigMac 25</p>	<p>TOP SCORES</p> <p>LittleT 21 Chi 23 BigMac 25 BigMac 12</p>	<p>TOP SCORES</p> <p>Chi 23 BigMac 25 BigMac 12 SchMac 15</p>
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Continuous scrolling top scores display. **Note** that 'BigMac 12' scrolls off the top and eventually back on to the bottom of the list

**Part 6: Custom Creative Features**

This is your chance for your team to add your own custom, creative elements to the BoilerMazer Game. **Design, test, integrate and fully document three (3) new BoilerMazer features or enhancements.** These must meet the following parameters:

- Custom creative features can be a part of either the Game Panel or the Maze Grid
- Your custom features must extend, enhance or add to the functionality of the simulation
- The custom features must be fully documented within the comments of the program
- Custom feature documentation must describe its purpose, functionality and the techniques you used for implementation
- Your custom features must not interfere with, change or take the place of the existing BoilerMazer specifications or requirements from either *Project 2* or *Project 3*.

**Submit to Blackboard**

- Upload your completed `project3.py` file to Blackboard by the due date.
- All team members must upload an identical copy of `project3.py` to their Blackboard account
- This assignment is due Monday, April 30<sup>th</sup> by 11:59 pm

**Project 3 Grading Rubric****Points**

Properly setup header with team member's names, Python filename is <code>project3.py</code>	5
Part 1: Diagonal Movement - Movement meets specifications	10
Part 1: Diagonal Movement - Changes to scoring are correct	10
Part 2: Black Holes – two (2) black holes created in random locations as specified	10
Part 2: Black Holes – Pete is transported correctly when encountering black holes	10
Part 3: Continuous Scrolling Top Scores – Display meets specifications	10
Part 3: Continuous Scrolling Top Scores – Display animation (scrolls) at all times	10
Part 4: Custom Creative Feature #1 – Documented, functional and meets specifications	20
Part 4: Custom Creative Feature #2 – Documented, functional and meets specifications	20
Part 4: Custom Creative Feature #3 – Documented, functional and meets specifications	20
Style / Format: Python code is formatted, commented and easy to understand	5
<b>Total Points</b>	<b>130</b>