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Bachelor's in Applied Computing with a Cybersecurity Concentration

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## Problem Statement

There are a plethora of maze games within the world. Imagine if we could expand upon solving said mazes and make a more interesting and difficult game out of it? In an ideal world solving mazes would be an engaging game utilized for strengthening the brain, but generally they are seen as easy, as you can see the whole maze and mentally map possible avenues before committing to a direction. This leads to them mostly just being used as a child's game on the kid's menu. This is a problem as these games could be used as a fun challenge to stimulate the brain, but they are so simple they are delegated to something to pass the time while waiting for food. This is an important problem to solve because if we managed to make maze games more challenging and interesting it could be utilized as a brain boosting game to help child development and elderly people. Mazes have been shown to help with sharpening memory, improving physical involvement such as hand-eye coordination, and helping with patience (Why Solving Puzzles). A solution to making mazes more impactful would be to add riddles throughout the maze to solve. Riddles would not only provide fun information throughout solving the maze, but it would add a nice difficulty curve for those who want a more challenging experience. This is evident through the kind of thinking riddles require compared to mazes. Riddles require less straight forward thinking and require the solver to utilize more of their knowledge of language, experience, and other mental activities to solve it (Danesi). They also improve cognitive functions relating to critical thinking, problem solving, and memory skills (Health Benefits). Compare this to mazes which require more visual and motor skills to solve such as hand-eye coordination (Why Solving Puzzles). Combining them together would increase the required brain usage and result in a more stimulating activity. Overall the simplicity of mazes

makes them extremely easy to solve, but a simple addition of riddles throughout the maze can enhance the experience and create a better brain exercise for the user.

### Project Description

The project will be a 2D maze game that will also have riddles to solve throughout the maze. The game will have multiple riddle types at various levels of difficulty to solve such as scientific riddles, trivia riddles, bible riddles, etc. The program will be written in C++ and will require the following packages:

`<iostream>` for input and output

`<string>` for explaining instructions

`<fstream>` for reading the riddles from another document

`<ctime>` for helping set up randomness of riddles

`<cmath>` for helping set up randomness of riddles

`<vector>`, `<list>`, or `<hashmap>` setting up the maze

I will need to utilize the command prompt to run and test the game as well as possibly a makefile to streamline said process. My motivation for this project stems from my love of video games. I enjoy playing them a lot and I think making one would be lots of fun, as in the past I have made a hangman game as a project, and it was quite enjoyable even with the obstacles that came with developing it.

### Outline of Future Research Efforts

I will be expected to make files containing different types of riddles, and then code will be made that lets the user choose different riddle types. Depending on the riddle type, a random riddle in the file will be chosen. Then code will be made so that the user can solve the riddle by entering the answer in. Potentially code will be added to give the user multiple attempts per riddle. After which code for a working maze will be constructed. Upon setting up the framework for a working maze, both the maze and the riddles will be combined, so that throughout the maze random riddles will take place. User will navigate through it by typing up left down right.

It will probably present itself on the command prompt looking something like this but slightly more complex. X = entrance & exit, each \* is a traversable point (and each traversable point has a chance to spawn a riddle, and all of the | \_ are walls.

```

X
|*|
|*|_|*|_|
|*****|
|---|*|---|*|---|
    |*|   |*|
    |*|   |--|
    X

```

Expected Deliverables: First Code Drop (Getting riddle types set up), Second Code Drop (the maze framework working), and Final Code Drop (Working maze with random riddles).

## Work Breakdown Schedule

Item	Description	Responsible Developer	ECD*	STATUS	Comments
1.	Draft Proposal				
1.1	Basic Info	Wesley Cassel	9/14/2024	Complete	
1.2	Problem Statement	Wesley Cassel	9/11/2024	Complete	
1.3	Project Description	Wesley Cassel	9/18/2024	Complete	
1.4	Outline of Future Research	Wesley Cassel	10/10/2024	Complete	
1.5	Schedule	Wesley Cassel	10/3/2024	Complete	
2.	Draft Requirements				
2.1	5 Requirements	Wesley Cassel	10/24/2024	Complete	
2.2	5 Requirements	Wesley Cassel	10/31/2024	Complete	
2.3	5 Requirements	Wesley Cassel	11/7/2024	Complete	
2.4	5 Requirements	Wesley Cassel	11/14/2024	Complete	
3.	Final Requirements and Proposal				
3.1	Complete Proposal	Wesley Cassel	11/21/2024	Complete	
3.2	Complete Requirements	Wesley Cassel	11/28/2024	Complete	

### Works Cited

- Danesi, Marcel. "Puzzles and the Brain." *Psychology Today*, Sussex Publishers,  
[www.psychologytoday.com/us/blog/brain-workout/200904/puzzles-and-the-brain](http://www.psychologytoday.com/us/blog/brain-workout/200904/puzzles-and-the-brain)
- "Health Benefits of Solving Riddles." DoveMed, [www.dovemed.com/healthy-living/wellness-center/health-benefits-solving-riddles](http://www.dovemed.com/healthy-living/wellness-center/health-benefits-solving-riddles)
- "Why Solving Puzzles and Mazes Helps with a Growth Mindset. – Kai's Clan." Kais Clan,  
<https://kaisclan.ai/why-solving-puzzles-and-mazes-helps-with-a-growth-mindset/>