

# Constricted Constrictor

## Team 26 - Product Backlog

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### Problem Statement:

Snake games are one of the most classic game designs: since the original Snake's debut in 1997 on the Nokia 6110, many new versions of the game have been designed. However, most of them are very basic and do not have many features, which make them increasingly monotonous the more one plays; players often experience visual fatigue after staring at the predictable movement of the snake for a long time. With our Snake game, players will be able to enjoy a modern take on the design through the inclusion of powerups, multiple levels, and different movement patterns, while still keeping the core concepts and gameplay.

### Background Information:

#### Audience

The traditional snake game falls into the common video game category, where the line itself (the snake) is the main obstacle of the game. Most of the existing snake games are very basic and they do not provide much special functionalities. We will provide our new version of the snake game to people who like to try new things and want to have a better experience when playing the snake game.

#### Existing Similar Project

There are some similar projects we can find on Youtube. One of those projects is an AI-based snake game that can learn how to play itself through hundreds of times of training.

#### Limitations

The limitation on that existing AI-based snake game is that it does not integrate that AI part with other parts of the game well. That AI-driven pathfinding can be used as a very powerful tool to improve the game experience.

With that AI driven snake we can actually add more modes and special functionalities to it. Also currently our biggest hindrance is that when the snake grows to a certain size under the auto path-finding mode, it is susceptible to hitting itself as the search method we use in our implementation is BFS, which has its own limitations. We might need to use AI model training to let it circumvent that kind of situation later in our development.

Youtube video link: <https://www.youtube.com/watch?v=i6xPMYvUrw4>

## Functional Requirements:

1. As a player, I would like to be able to move the snake in the four basic directions (up, down, left, right).
2. As a player, I would like to be able to move the snake diagonally (if time allows).
3. As a player, I would like to be able to move the snake by having it follow the mouse cursor (if time allows).
4. As a player, I would like to start the game by pressing the start button.
5. As a player, I would like to receive points from eating beans.
6. As a player, I would like to be able to register for an account.
7. As a player, I would like to be able to login with my account.
8. As a player, I would like to be able to change my login credentials.
9. As a player, I would like to have my credentials be encrypted (if time allows).
10. As a player, I would like to save the 10 highest scores.
11. As a player, I would like to save the 10 longest times survived.
12. As a player, I would like to be able to play a 1v1 versus mode with a partner.
13. As a player, I would like to be able to change the difficulty level of the game
14. As a player, I would like to change the map for the game
15. As a player, I would like to be able to customize the looking of the snake.
16. As a player, I would like to be able to accumulate energy when I play.
17. As a player, I would like to activate a special skill when my energy is full.
18. As a player, I would like to bring up a 'how-to-play' menu/screen when a button is interacted with.
19. As a player, I would like to be able to pause the game and bring up a pause screen by hitting esc.
20. As a player, I would like to be able to resume the game from the pause screen.
21. As a player, I would like to be able to quit and return to the home screen from the pause screen.
22. As a player, I would like to be able to have the ability to restart from where they die by either watching an ad or using coins from previous games.(if time allows)
23. As a player, I would like to be able to choose between playing again or returning to the home screen.
24. As a player, I would like to be able to compete with other online players in the 1-on-1 mode
25. As a player, I would like to be able to have different obstacles (like walls) to increase the unpredictability of the game
26. As a player, I would like to be able to send a link to invite my friends to play with me (if time allows)
27. As a player, I would like to be able to have a timed big apple shown up randomly after a bean has been eaten.
28. As a player, I would like to be able to activate a big apple powerup to double my score for a short period of time.
29. As a player, I would like to be able to activate power ups that either increase or decrease the speed of the game.
30. As a player, I would like to be able to activate power ups that affect the tangibility of the snake.
31. As a player, I would like to be able to click on a "special thanks" button to see the developers of this game.

32. As a player, I would like to be able to see the background color change when game is ongoing/paused
33. As a player, I would like to be able to exit out of the game by clicking the close button on the right corner of the game interface.
34. As a player, I would like to be able to minimize the game to a small window by clicking the minimize button.
35. As a player, I would like to be able to customize the keys to control the snake movement to keys of my preference.
36. As a player, I would like to be able to listen to background music while playing.
37. As a player, I would like for the background music to decrease in volume when the pause screen is up.
38. As a player, I would like to be able to toggle background music.
39. As a player, I would like to have sound effects for gameplay interactions.
40. As a player, I would like to be able to toggle sound effects.

## **Non-functional Requirements:**

### **Architecture**

The project should be well organized so that it will be easy for others to understand it. It will also improve the extensibility. We will use Maven for project dependencies management. The project should follow the Model-View-Controller model so that the structure would be clear and it will be easy to add functionalities.

### **Gameplay**

Gameplay should be both smooth and responsive. This is important because Snake is a simple concept that also resides on precision, so ensuring that the user has a smooth experience is very important. Our goal is to implement our game with 60 frames per second so the playing experience is as smooth as possible.

### **Security**

Since there will be a multi-user system, users will be able to create accounts and log in. It would be very insecure if we store the user information with files. Therefore, a database is required. We will use MySQL as the database to store users' information and any additional data related to that user and we will use JDBC and Druid datasource to access the database for user data. Players will be required to enter their email and phone number when registering for the game, and these along with their account and password will be stored in the central database. So if a player forgets his/her password, he/she can use the registered phone number or email to reset the password. Reset links will be automatically sent via text or email (we may need to use some APIs to implement this function if time allows). These resources will allow our project to be scalable with users.

### **Usability**

The user interface of the program should be easy to understand and use for the users and the users should have a good experience using it. It should be easy for the users to navigate. It should also be well designed so that the UI is not plain. We will use Java Swing and some additional Java graphics libraries for the GUI.