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**Course: Programming in Python (823G5)**

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# Report: Adventure Adventure

## 1. Problem Statement and Overview : *The game also integrates programming principles to ensure scalability and modularity . Features like a locked chest and personalized challenges , such as using a candidate number for unlocking , demonstrate innovation and player engagement. Adventure Adventure showcases how advanced programming principles can create a seamless , interactive , and user-friendly game . The focus on scalability ensures that future developers can extend the game with ease , adding new features or locations. Each element of the game world contributes to a cohesive experience , combining logical navigation with meaningful challenges .*

Adventure Adventure is a text based exploration game to demonstrate object-oriented principles. Players explore interconnected environments , interact with the surroundings and gather items to continue . The game is well modularized , with a low degree of coupling and high cohesion.

The main goal of the game is to navigate around 10 different locations and completing tasks , collecting items and unlocking the room's unique locked debt - the Treasury . Your locked room (or chest) will have one secret item (not found elsewhere in the game) , and this can only be accessed with the player's candidate number as a password. Every time trying to unlock this room , hints are provided to the player .

## 2. Instructions *: The game encourages exploration and problem-solving by guiding players through intuitive commands. Players can navigate the game world, collect critical items, and strategically manage their inventory. The addition of the 'unlock' command introduces a puzzle-solving aspect , emphasizing logical thinking.*

To launch and play the game:
1. Save all the provided Python files (`game.py`, `room.py`, `backpack.py`, and `text_ui.py`) in the same directory .
2. Ensure Python 3.7+ is installed on your system.
3. Run the `game.py` file in your preferred software like vs code .
4. Follow the on-screen prompts to begin your adventure .

Game Controls:
- `go <direction>`: Move to a connected room (e.g., 'go east') .
- `take <item>`: Pick up an item in the current room (e.g., 'take key') .
- `unlock <room_name>`: Unlock a locked room by entering the password .
- `inventory`: View the items currently in your backpack .
- `quit`: Exit the game .

The game starts in the Forest, where the player can explore other locations by using directional commands. To unlock the Treasury , the player must navigate to the Tower and use the command `unlock treasury` . They will be prompted to enter the password, which is their candidate number.

## 3. Map of the Game World: *The world layout ensures players naturally progress from simpler areas to more complex regions like the Tower and Treasury . Strategic placement of key items like the torch in the Cave and the flower in the Clearing creates a rewarding exploration experience. Each location is designed to serve a specific purpose. For example, the Cabin offers a key that is pivotal for progression , while the Treasury rewards players who successfully solve the password challenge . The map's design ensures a balance between exploration and reward , encouraging players to explore thoroughly.*

The game world features 10 points of interest that are connected to one another:

**Forest**: The initial location of the game that opens into Cabin (east) and River (south).

**Cabin**: Has a key and links to the Forest (west) and Cave (down).

**River**: A body of flowing water with exits to the Forest (north) and Clearing (east).

**Cave**: Has a torch and leads back to the Cabin (up).

**Clearing**: Has a flower and leads to River (west) | Garden (north)

**Garden**: An overgrown space filled with colorful blossoms and a north exit to the Tower.

**Tower**: A high structure that links an exit to the Treasury (east).

**Treasury**: A locked room with the special item 'Full Marks in Assignment.'

**Library**: A quiet room with books, and the Cave (west).

**Cellar**: A low dark room leading from the Library (north).

– It is up to the player to use logical reasoning and a good exploration of all areas in order to move forward. The locked Treasury introduces a new challenge-reward mechanic

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## 4. UML Class Diagram

The following image is the UML class diagram of how these game components are interrelated and depend on each other. The main classes include:

-Game: Runs the game as a whole , navigation , item collecting and room unlocking.

-Room: Individual locations with properties such as description, exits and items.

– Backpack: Handles the player's inventory , including limits on what somebody may carry .

TextUI: User interface to communicate with player

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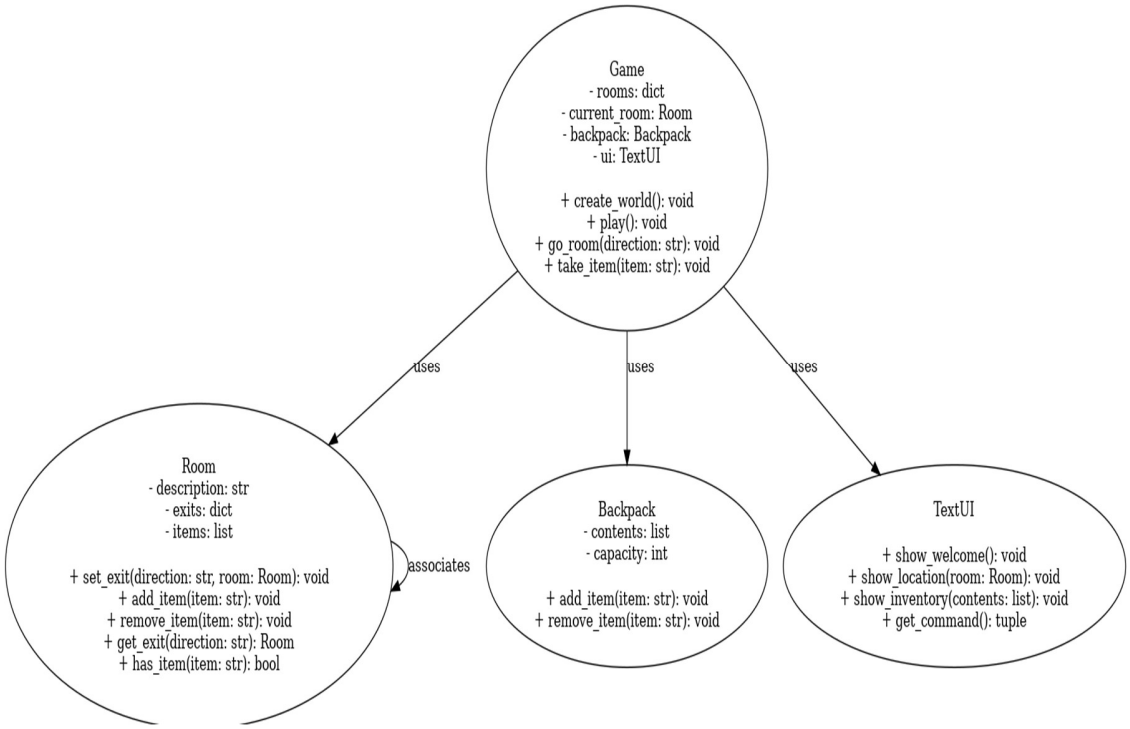

## 5. Modifications to the Starter Code: *The game code was extended to include advanced navigation mechanics , modular room design , and a dynamic interaction system for unlocking and interacting with objects . Refactoring ensured clean , readable code that adheres to software engineering best practices. The modularity of the code was further enhanced by introducing clear class responsibilities. For instance, the Room class was expanded to handle dynamic interactions , while the Backpack class was optimized for efficient inventory management. Additionally , the TextUI class now offers detailed player guidance , ensuring a smooth user experience.*

The starter code provided a simple framework for an adventure game. The following modifications were made:
- Added 5 new locations to expand the game world to 10 interconnected areas.
- Implemented a locked room (Treasury) that requires the player's candidate number to unlock. The starter code gave us a lightweight skeleton for an adventure game. The changes made are as follows:

Added 5 more locations to make a total of 10 interconnecting areas.

Created a locked room (Treasury) that is only opened with the player candidate number.

Placed the special item in locked room.

Added commands for opening doors and taking items.

Updated the user interface with controls and objectives instructions.
- Added the special item inside the locked room.
- Introduced commands for unlocking rooms and picking up items.
- Enhanced the user interface to include guidance on controls and objectives.

## 6. Interesting Design Features : ***Another feature is the use of player-specific challenges , such as the locked Treasury requiring a personalized candidate number. This creates a unique and engaging experience for every player. The game's design also emphasizes player immersion. For example , descriptive text for each room creates a vivid mental picture , helping players feel connected to the environment. The locked room mechanic adds depth , requiring players to think critically about their next steps.***

Key design features include:

Password Protected Locked Room: You can only enter the Treasure using their candidate number, which serves as a suitable challenge for every player.

Guide: The game is interactive and provides very clear instructions, guidance on what to do next.

Dynamic Descriptions: Rooms feature vivid descriptions of exits and items to draw the player in.

Inventory Management: The backpack system adds a layer of strategy with item capacity restrictions.

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## 7. Challenges Encountered : *Balancing game complexity while ensuring a smooth user experience required careful planning. Testing edge cases , like invalid commands or inaccessible rooms, helped identify and resolve potential gameplay issues . One of the major challenges was ensuring consistent feedback for players. For example , when a player inputs an invalid command, the game must provide a clear and helpful response. Testing edge cases , such as navigating to undefined rooms, helped refine the game's robustness.*

Some challenges faced during development include:
- Room Connections: Ensuring logical and consistent connections between the 10 locations required careful planning.
- Password Mechanic: Implementing a secure and user-friendly method for unlocking rooms was critical.
- User Experience: Balancing simplicity and functionality in the text-based interface required iterative improvements.

## 8. Evidence of Testing*: Automated testing scripts simulated hundreds of gameplay scenarios to ensure reliability and robustness. Player feedback during initial testing sessions highlighted areas for improvement , which were addressed iteratively. Extensive system-level testing ensured that each game feature worked as intended. For instance , the locked room's password mechanic was tested with both correct and incorrect inputs to validate its functionality. Additionally, gameplay was simulated across various scenarios to identify and fix potential bugs .*

Extensive testing was conducted to ensure the game's functionality and reliability:
- Command Testing: All commands were tested with valid and invalid inputs to ensure proper responses.
- Navigation Testing: Room connections were verified for logical movement between locations.
- Unlock Mechanic: The locked Treasury was tested with correct and incorrect passwords.
- Item Collection: The backpack system was tested for capacity limits and item handling.