Final Project Reflections Document
CS 162 / Intro Programming II
Student: Joaquin Saldana

Software Design/Briefing

As my final project, I've decided to construct a game/puzzle in which the user will take on the role of Batman. After careful thought I settled on Batman since he's my favorite super hero in the super hero universe and as you can imagine I'm a big comic book fan.

The user's ultimate goal is to find the Joker. Below is a synopsis of the game "plot":

The Joker has just escaped Batman's custody. It's now it's Batman's job to find him before it's too late. If Batman doesn't find the Joker, the Joker will unleash his toxic nerve gas on the people of Gotham City. Along the way, Batman will need to collect certain gadget's and may encounter other puzzles/enemies.

Batman must find him by his 8th move, or else the Joker will succeed in his plan to release the toxin. Once found, however, the Joker will not go quietly.

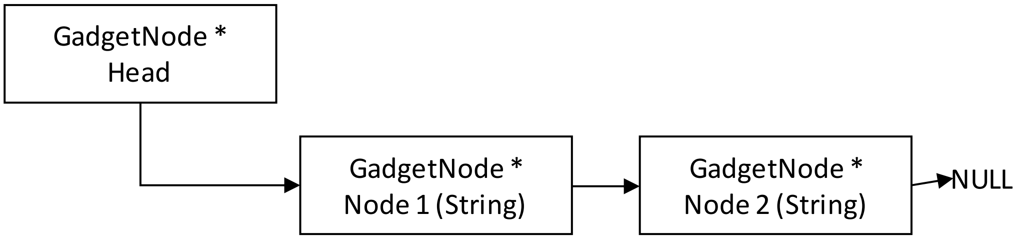
As the author, I've decided to create a **linear linked list** to simulate Batman's gadget/utility belt. This structure contains the following data members/functions:

GadgetContainer (Linear Linked List)

protected:
struct GadgetNode {string name,
GadgetNode * next}
GagdetNode * head

public:
class constructor
class destructor
void addGadget(string)
bool isListEmpty()
bool isGadgetInContainer(string)
void printGadgetList()

Below is a diagram on how the structure is constructed:



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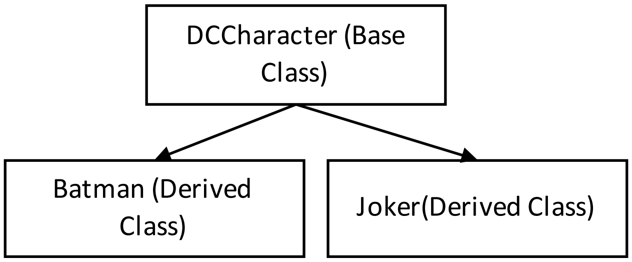
I made a conscious decision to not include a "remove" function since technically speaking, there is no reason why Batman would want to remove a Gadget once it's in his possession. These gadget's will be required if he's to move around the environment which is a linked node structure.

Additionally I created an inheritance hierarchy for the DCCharacters (Batman and Joker) with inherit set and get methods.

Below is a diagram of the inheritance tree:



Finally, I created a diagram of the linked structure which details the levels and how the user will traverse the structure:

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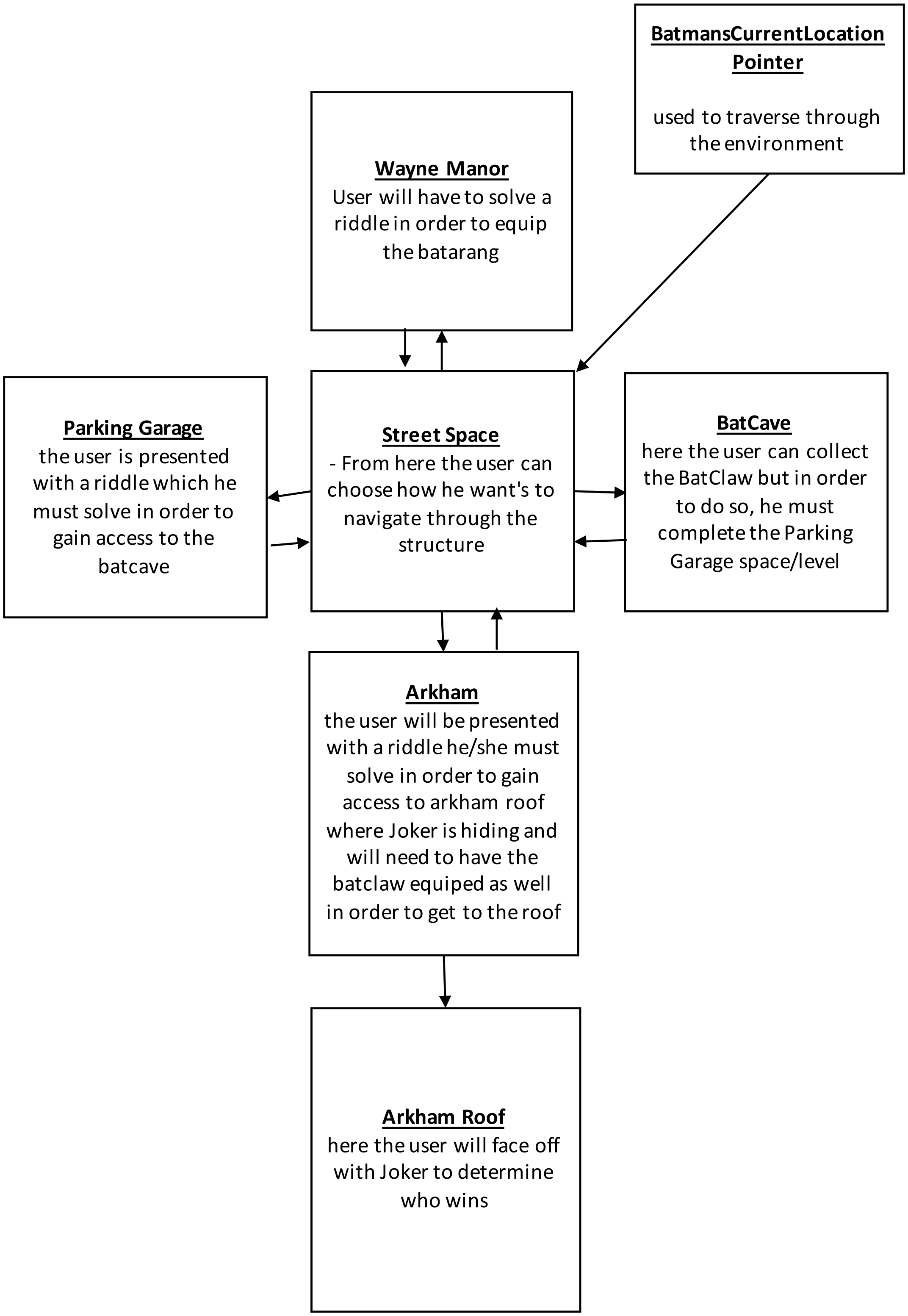

BatmansCurrentLocation Pointer

used to traverse through the environment

Wayne Manor

User will have to solve a riddle in order to equip the batarang

Parking Garage

the user is presented with a riddle which he must solve in order to gain access to the batcave

Street Space

- From here the user can choose how he want's to navigate through the structure

BatCave

here the user can collect the BatClaw but in order to do so, he must complete the Parking Garage space/level

Arkham

the user will be presented with a riddle he/she must solve in order to gain access to arkham roof where Joker is hiding and will need to have the batclaw equiped as well in order to get to the roof

Arkham Roof

here the user will face off with Joker to determine who wins

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Reflections

Throughout the course of incrementally developing the program I found I had several memory leaks. In particularly when developing the spaces. I found using pointer's with dynamic assignments in the space class and derived classes was causing memory leaks. I was unsure why so instead I declared a static variable for the various objects I was using, in particular I was having trouble with the space classes that instantiated a string in the constructor. Not entirely sure why this was happening.

In addition, I found several logic errors which I later corrected in my main program during the menu options.

I also borrowed the logic concepts from our assignment 3 of fantasy combat for when Batman faces the Joker and there's a battle. Much of the same logic in the sense of attack, defense, health, and so forth.

Each character will have a max offense (Batman top offense is 25) and Joker's top offense is 15 while having a slightly larger health.

Test Plan

Test Case	Input Values	Driver Functions	Expected Outcome	Observed Outcomes
Ensure there were no memory leaks in the creation of various dynamic space classes and dc character classes	Various dynamic allocations with pointers of objects including gadget container and utilities functions	Standard instanitation in main	No memory leaks	Memory leaks were observed when using valgrind. This was corrected in the .hpp and .cpp files by using static objects when applicable
Ensure the structure is properly constructured and accessible to the user including restriction of visiting or advancing to other pointers	Ensure the user cannot access the Batcave and the Arkham Roof without completing the other levels first	While loops and Boolean variables	For the program to warn the user he is not allowed to visit this part of the structure without completing the necessary levels	Program warned the user he/she must complete the necessary levels

within the structure without completing the necessary levels				
Proper pointer assignments within the structure and no pointers were lost or assigned as null	N/A	While loops and Boolean if statements	For the program to polymorphically tell me what levels I'm currently in	Program reacted correct and only used DCCharacter and Space pointers throughout the program and each time it printed the correct "Space" name and "Character" name
Ensure the program is only accepting numbers when applicable and not character	Integers	While statements and my utilities class	For the program to warn the user of incorrect input	Program did warn the user of incorrect input