Night Knights
Technical Document

Introduction:

        Welcome to the nation of Hiber, a sleepy little kingdom in a distant land. However, all is not well in the kingdom; mysterious monsters known as Nightmares have begun showing up and causing havoc in the land. You are a member of the Night Knights, who have been summoned by the king to defeat the Nightmares and protect the Hiberions.

        A sleepless Knight cannot protect citizens from Nightmares; in order to fight, you must stay well rested. By getting a good night's sleep in real life, your improved health will increase the performance of your knight. If you stay up too late, your lack of sleep will weaken your knight. Improve your sleeping habits and save the kingdom!

        By using the mobile app to track your sleep, you can earn energy with which to fight Nightmares with on the website. The overall purpose of Night Knights is to encourage healthy living by using the unique and proven reward system of a game. While gaming and sleep are often viewed in juxtaposition, Dream Team hopes to reverse this conception; thereby using gaming to encourage and reward good sleeping habits.

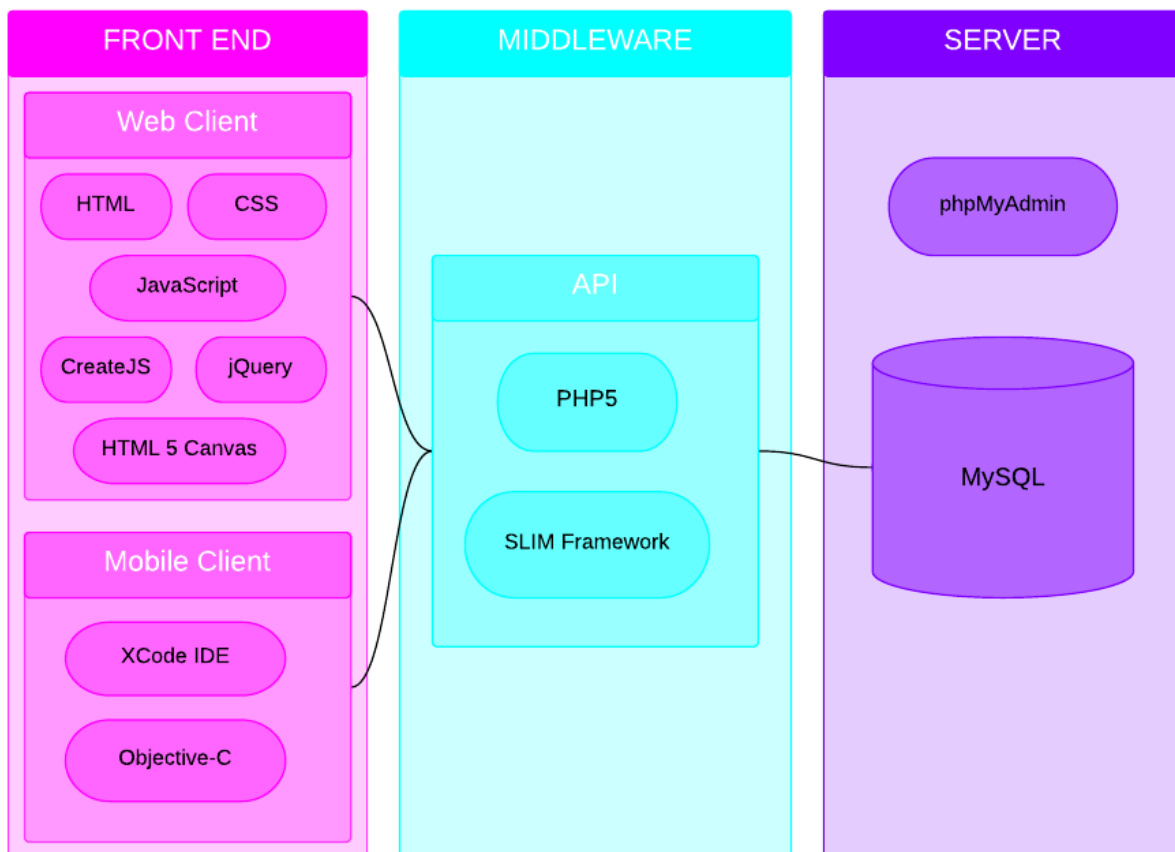## Software Requirements:

Web Client:
- ➔ Create an Account
  - ◆ Requires a unique email
  - ◆ Requires a password
  - ◆ Requires a unique Knight's name (player name)

- ➔ Login to an Existing Account
  - ◆ Requires email
  - ◆ Requires password
- ➔ View Character Info
  - ◆ View current energy
  - ◆ View character stats
  - ◆ View current level
    - ● View total XP
    - ● View XP to next level
  - ◆ View current item
    - ● View weapon stats
    - ● Swap current weapon
- ➔ View Current World Bosses
  - ◆ View energy cost
  - ◆ View treasure reward
- ➔ View Leaderboards
  - ◆ View player (rankings around player - i.e. user is 121st in world, show the next 5 above and below user)
  - ◆ View top ten players
- ➔ Play the Game
  - ◆ World Map
    - ● Solo Mode:
      - ○ Select a monster from the world to fight
      - ○ Earn treasure and experience
    - ● Team Mode:
      - ○ Select a Boss monster from the world to fight
      - ○ Attack the monster to take out some of it's health
  - ◆ Encounter
    - ● Attack the Monster
      - ○ Use a Melee attack
      - ○ Cast a Spell
    - ● Run from battle
      - ○ Forfeit treasure and experience earned.
- ➔ View Account info
  - ◆ Change user email
 - ◆ Change password
  - ◆ Reset password

Mobile Client:
- ➔ Alarm Clock
  - ◆ Set alarm time
  - ◆ Change alarm sound
  - ◆ Wake up
    - ● Can use Snooze for an energy penalty
  - ◆ Earn energy depending on duration
- ➔ Login to an Existing Account
  - ◆ Requires email
  - ◆ Requires password
- ➔ Create an Account
  - ◆ Requires a unique email
  - ◆ Requires a password
  - ◆ Requires a unique Knight's name
- ➔ Persistent Module to allow a User to save their login information.

Detailed Software Architectural Diagram:

Use Case Diagram:
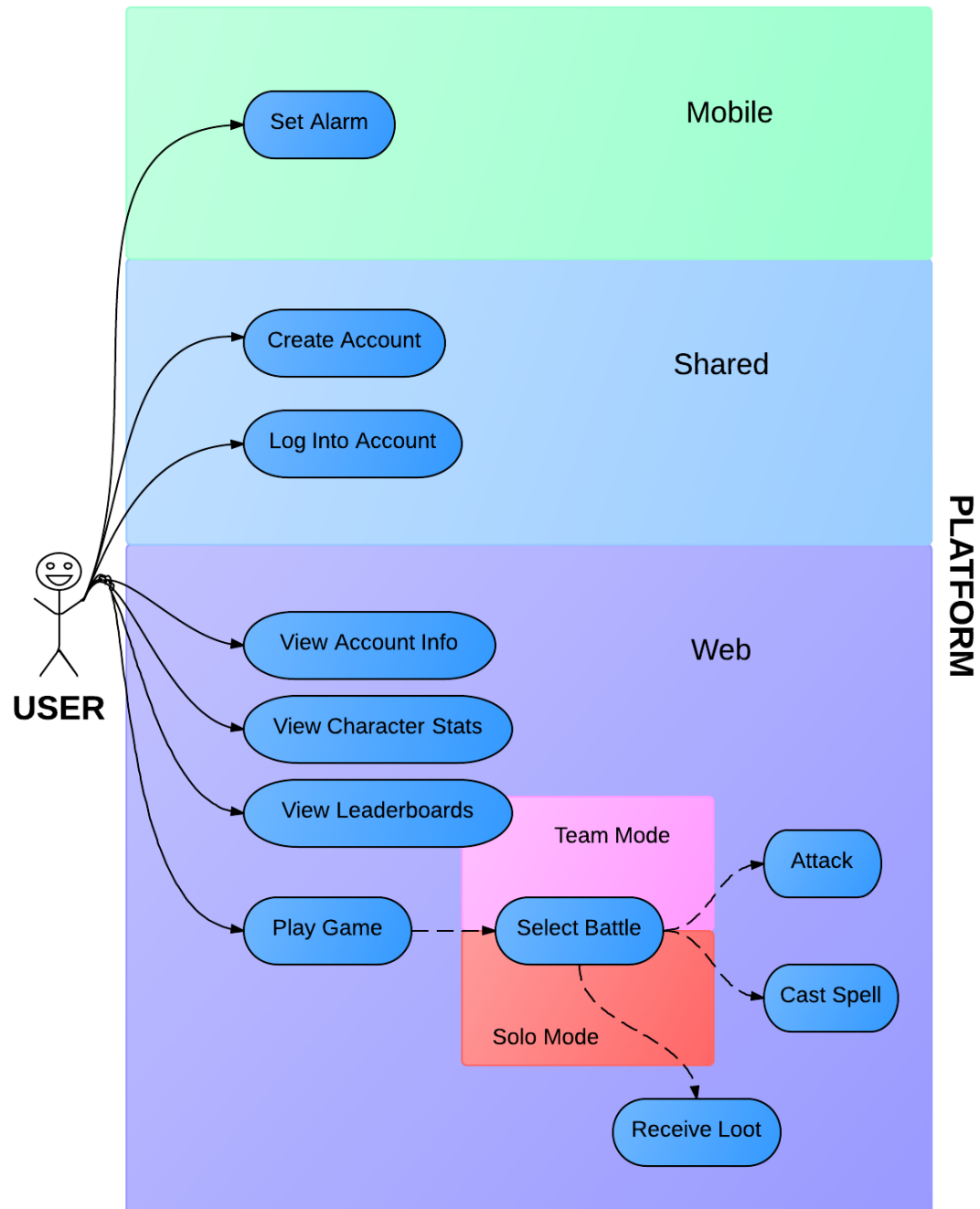
Database Model:

The model of the database for Night Knights (see Appendix A) satisfies the above Software Requirements. The following is the breakdown for how the model, as seen in Appendix A, satisfies those requirements:

- Create User
  - The username attribute in the Users table is a unique key (therefore it is impossible for there to be duplicate usernames). There is an email field for the users email, and finally a password field that will be the hashed and salted password of the user.
  - Each character is associated with one user. When a User is added, the middleware will also create the corresponding Character.
- User Login
  - Given a username, and the hashed and salted password the database can be queried for the existence of the user and correctness of the supplied password.
- View Character Stats
  - Each character in the Characters table has attributes for life-points and current experience. Since level is based off of experience, to display a character's progression to the next level would be a simple arithmetic operation.
- Leaderboard
  - Given a username (or user id) all the personal stats associated with that character. The "rank" of a player is directly related to their accumulated experience (e.g. the player with the highest accumulated experience, they will have the highest overall rank). Therefore to the rank of a player is the number row their entry is on when players are ordered by experience descending.
- Play the Game
  - The database will hold a representation of the Areas a user may play through. The database also holds the Monsters the user would be fighting, and the items the user would be winning from playing the game.
  - During Team Mode, the user can participate in multiple "WorldFights" which is represented in the WorldFights table, where they fight against a WorldBoss from the WorldBosses table
  - The Dream Mode is triggered if the users "life-points" go to zero. The Database does not hold anything extra or different for this mode
- View Account Information
  - The Database supports basic account statistics. The Database allow the

updating of a users email, and password.
- Mobile Client
  - The Database does not store anything specifically from the mobile client. The Mobile client stores all necessary data in a persistent module. To either create a user or update a user's life-points, the Mobile Client will hit the REST API layer to accomplish that functionality.

User Profile:

Name	Jonathan Reistad	Arya McCarthy	Carly Kubacak	Blake Danner	Jon Lyttle
Gender	Male	Male	Female	Male	Male
Age	20	18	21	24	20
Education	Sophomore	Freshman	Junior	Graduate Student	Sophomore
Salary	<$2000	<$2000	<$2000	<$10000	<$10000
Profession	Student	Student	Student	Student	Student
Average time to go to bed	1:00 AM	1:00 AM	2:00 AM	12:30 AM	12:00 AM
Average time to wake up	9:00 AM	8:00 AM	9:00 AM	8:00 AM	7:30 AM
Currently motivated to go to sleep?	Yes	Yes	No	No	No
Technical Proficiency	Medium-Low	High	High	Medium	Medium-High
Gaming Proficiency	Medium	Low	Low	High	Medium

Blake: Blake Danner is a 24 year old MMO and gaming wizard studying at Perkin's School of Theology. Ever since a young age, Blake has loved video games, and has played everything from Pokemon to World of Warcraft. Blake often finds himself staying up late for no reason

many nights, and wants to get more sleep so he can be healthier and more prepared for class. When presented with the idea for Night Knights, Blake wanted a functional prototype immediately. Blake hopes to use the app to keep him from stumbling around the internet at two in the morning.

Jon: Jon is a 20 year old film major at Houston Community College who works part time at AMC. He loves the medium of film, and enjoys watching videos of all kinds on youtube. However, his passion for media has been keeping him up later and later at night, and he wants to change. He enjoys playing video games with his friends on the weekends, and feels that using a game would really help him find the motivation to go to sleep earlier. He's excited about the prospect of Night Knights, and can't wait to show his friends who is number one!

Arya: Arya is a 18 year old Computer Science Major in the Bobby B. Lyle School of Engineering with extensive experience in advanced computer concepts. He tends to play games more casually and doesn't see them as his primary medium of entertainment. He tends to stay up late at night sitting around and talking with the various people he finds in his dorm lounge until late at night and would like to find something that can motivate him to go to bed earlier. When the concept of Night Knights was presented to him, he was against using it because he isn't a particular fan of overly complex games. However, after explaining more about how the game mechanics of Night Knights work and what the game is trying to accomplish, he became willing to give it a try to see if it can help him attain a better sleep cycle.

Jonathan: Jonathan is a 20 year old Business Major in the Cox School of Business. He has a moderate amount of experience playing video games as well as above-average experience with using computers. Jonathan's experience with videogames is diverse; he has played several different genres of games spanning from PC to the XBox and PlayStation families. He has the most experience with the first-person shooter genre because that is mostly what he and his roommate play. Jonathan tends to spend several hours laying on his bed watching youtube videos before he finally goes to bed due to boredom. When he was presented the idea of Night Knights and what the project was attempting to do, he became excited at the prospect of a game that could give him enough motivation to go to sleep earlier.

Carly: Carly is a 21 year old Computer Science Major in the Bobby B. Lyle School of Engineering with a high degree of expertise with a computer. However, despite her affinity for computers, Carly only plays video games at a very casual level. Most of her gaming experience comes from either playing Dance Dance Revolution or Guitar Hero with her friends. Only on rare occasions does she play single-player games. Carly tends to find herself on her computer late at night browsing Tumblr before she goes to bed and would like to try to be able to get to bed earlier. She currently goes to bed late at night and it tends to cause her stress in the mornings when she tries to get to class on time. When Night Knights was presented to Carly, she liked how the game was focused on trying to get the player to get more sleep in order to play the game more. Despite not being a big video game fan, Carly said that she would give Night Knights a chance because she is a big supporter of what the game is trying to achieve.

Questions about sleep habits/experiences:

➔ What is the average time you go to bed during the week? What about on the weekends?

Blake: *Generally around 12:30 during the week, 1:00 on weekends.*
Jon: *I go for about 12 during the week, generally. 2:00 on weekends.*
Carly: *1-2 AM on the weekdays and typically 2-3 on weekends unless I'm tired. Then I'll go to bed around Midnight.*
Arya: *1:00 AM during the week and 2:00 on the weekends.*
Jonathan: *During the week 12:30 AM and 1:30 on the weekends.*

➔ How do you generally feel when you wake up in the mornings?

Blake: *I usually still feel sleepy.*
Jon: *Groggy. I don't want to get up.*
Carly: *I wake up and usually feel really tired.*
Arya: *I typically wake up angry, tired and very disoriented.*
Jonathan: *Tired, and disgruntled with the world.*

➔ If you wake up with an alarm, do you use the snooze button? If so, how many times do you press it before finally getting up?

Blake: *I do not.*
Jon: *Yes, usually only once.*
Carly: *Yes, multiple times typically 5-6 before I finally get up.*
Arya: *Yes, and depending on the day I may hit snooze anywhere between 3 and 9 times.*
Jonathan: *No.*

➔ Do you want to get up earlier in the mornings or are you okay with when you wake up?

Blake: *I'm okay with when I get up.*
Jon: *I want to get up earlier.*
Carly: *I would like to get up earlier if possible.*
Arya: *I want to wake up earlier if possible.*
Jonathan: *I am okay with when I wake up.*

➔ Do you feel as if you are getting enough sleep on a nightly basis?

Blake: *No. I would still like to go to bed a little bit earlier, because I know that I usually wake up around the same time regardless. Because I still wake up sleepy, it probably means I still need some more sleep.*

Jon: *No. Not at all.*
Carly: *No. I get enough sleep on the weekends but I feel that I do not get enough sleep on the weekdays.*
Arya: *No. Weekends are when I would like to catch up on sleep but I get less sleep on the weeks actually.*
Jonathan: *I'm probably not getting enough, I think I am on the bottom range of a healthy amount.*

➔ What is typically the last activity you do before going to sleep and about how long do you do it?

Blake: *I usually check Twitter on my phone for 5-10 minutes. Before that I'm probably playing some kind of game.*
Jon: *Watching Youtube videos for a couple of hours.*
Carly: *On Tumblr for about half an hour before I go to bed.*
Arya: *Socializing in the dorm lounge for about 2 hours.*
Jonathan: *Browsing the internet on my phone, and it ranges from about 15 to 30 minutes.*

➔ If you don't get enough sleep on a particular night, what is generally the cause?

Blake: *If I come home late, then it takes me about an hour to wind down, regardless of how late I get home. I just won't go to sleep even though I should, just kind of wasting time.*
Jon: *I'm generally stressed out about something at work, or watching more videos.*
Carly: *Procrastinating on my homework.*
Arya: *Too much lounging.*
Jonathan: *Not changing when I go to bed for when I have to get up early the next day.*

➔ What is your biggest source of sleep procrastination outside of schoolwork?

Blake: *Playing video games; computer games, specifically.*
Jon: *In general, thinking about too many things. Worrying about things that I have to do.*
Carly: *Watching movies on occasion does, or staying out late with friends.*
Arya: *Lounging.*
Jonathan: *Internet.*

➔ Do you feel that having a source of motivation to go to sleep earlier will be beneficial to you in trying to get more sleep?

Blake: *I sure hope so! I'm hopeful that it would.*
Jon: *Yes.*
Carly: *Yes.*

Arya: *Yes.*
Jonathan: *Yes.*

➜ Do you like having the ability to set the volume of your alarm or do you prefer the default volume?

Blake: *I like to be able to set the volume. Who doesn't?*
Jon: *I don't care.*
Carly: *I like to be able to set the alarm volume myself, because I occasionally fall asleep in public and would like to have a quieter alarm.*
Arya: *Happy with it loud.*
Jonathan: *I like the ability to set my alarms volume.*

Questions about video game habits and experiences:

➜ Do you enjoy playing video games?

Blake: **Sarcasm* From time to time. YES!*
Jon: *Yes!*
Carly: *Not particularly.*
Arya: *No.*
Jonathan: *Yes I do.*

➜ How often do you play video games? How long do you play them per day/session?

Blake: *Daily. 2 hours.*
Jon: *Once a week. Just for about an hour.*
Carly: *On the rare occasion, and for not very long, sub one hour.*
Arya: *Rarely, and not for long.*
Jonathan: *I play them daily and for about 45 minutes per day playing.*

➜ What genre of video game do you play the most often, or what are some of your favorites?

Blake: *Role Playing Games. In general, I love them all.*
Jon: *Sandbox. Minecraft and Garry's Mod are some of my favorites.*
Carly: *Guitar Hero, and Just Dance (Music games)*
Arya: *Pokemon.*
Jonathan: *I like the FPS (First person Shooter) as well as sports games.*

➜ Would you label yourself as a gamer? Why or why not?

Blake: *Yes, I would. It is my go-to hobby of choice, and I connect with people through games.*
Jon: *Yes, because I appreciate games and their artistic value.*
Carly: *No, Because I don't play often.*
Arya: *No, I don't enjoy video games as a means of social interaction.*
Jonathan: *I consider myself a casual gamer, I enjoy games on occasion but I don't follow any blogs or other video game related news.*

➜ Do you enjoy video games that link gameplay to your physical activities?

Blake: *Yes, I recently played "Wii Fit U" for the first time and was fascinated with the ability to mix a fun game with something that would actually improve my health.*
Jon: *I've never done anything like that. I like the idea though!*
Carly: *Yes, because the only games I play involve a degree of physical activity.*
Arya: *No.*
Jonathan: *Yes, I tend to not be good at them but I will still try them.*

➜ Would you feel more motivated by having a competitive feature added to the game?

Blake: *If it were with some of my friends, yes. If it were random people, I wouldn't really care.*
Jon: *Yeah.*
Carly: *I guess, I'm not competitive but a competitive game is a bit more fun because of the interaction between players.*
Arya: *No.*
Jonathan: *Yes.*

➜ Do you prefer games that have numerous easy battles or do you prefer to have fewer fights that offer a more challenging experience?

Blake: *Hard to say, really. I prefer a happy medium where the battles are frequent enough to not be too rare, but still have enough depth so that they're not mindless.*
Jon: *Fewer fights, more challenging. I don't like grinding.*
Carly: *Numerous Easy battles, having fewer harder battles causes me to take longer to learn how to play with detractes from its appeal.*
Arya: *Easy, because they end faster.*
Jonathan: *Fewer easier battles.*

➜ When you play a video game, how do you like your player statistics presented to you? Which statistics do you feel are the most important to see?

Blake: *I like to be able to see them at my own will, rather than blasted at me all the time. My level, how close I am to leveling up, maybe even how long I've been playing.*

Jon: *Playtime would definitely be important for me. The usuals are also really important.*
Carly: *Summary of how you are doing upon exit is nice.*
Arya: *I don't want to see them at all.*
Jonathan: *Depends on what game I'm playing, but for the most part I don't care what is displayed to me.*

O/A Analysis:

Objects	Attributes	Actions
Weapon	Combat Stats, Name, Image	Attack, Cast Spell, View Info, Swap
Nightmare	Type (Solo/World), Treasure	Start Encounter
Energy	Amount, Capacity	Recharge, Expend
Map	Type (World/Area), Nightmare Encounters	Start Encounter, Choose Area
Leaderboard	Rankings, Top Ten	View Info
Account	Energy, Level, Experience, Inventory	View Info
Encounter	Turn, Opponent Nightmare	Attack, Cast Spell, Run Away

O/A Matrix:

	Attack	Cast Spell	View Info	Swap	Start Encounter	Recharge	Expend	Choose Area	Run Away
Weapon	X	X	X	X					
(A) Combat Stats									
(A) Name									
(A) Image									
Nightmare					X				
(A) Type (Solo/World)									
(A) Treasure									
Energy						X	X		
(A) Amount									
(A) Capacity									
Map					X			X	
(A) Type (World/Area)									
(A) Nightmare Encounters									
Leaderboard			X						
(A) Rankings									
(A) Top Ten									
Account			X						
(A) Energy									
(A) Level									
(A) Experience									
(A) Inventory									
Encounter	X	X							X
(A) Turn									
(A) Opponent Nightmare									

Paper Prototypes:

https://www.dropbox.com/sh/lwwo1dmss4zvht6/g5i-BsXQC1

Usability Test Outline:

Number of Users to Test: *3*
Focus: *Learnability and Errors*
Scale: *The more usability issues that any user has with the interface determines the severity of the issue. However, this is heavily dependent on the user's background. Certain tropes were used in the design that will be obvious to the user only if they are experienced with software that utilizes it.*

Outline:
1. Begin the test by describing the system as a whole to the user.
   a. Describe the overall concept of collecting energy and playing the game
   b. Talk about the Mobile Client and the role it's supposed to fulfill.
   c. Talk about the Web Client and it's role.
   d. Describe how the two ends integrate on a high level.
2. Ask the user to speak out loud and describe what they're thinking throughout the process, any difficulties they're facing, or whatever suggestions they may have.
3. Show the user the mobile app's main page and ask them to make an account.
4. Observe the user while they attempt to sign in and note any difficulties they face.
5. Once the user has signed in, ask them to set an alarm and prepare to go to sleep.
6. Once they've completed the task, inform the user that they went to bed and that it's now time to get up.
7. Simulate the alarm going off. Observe what the user does when presented with the new options.
8. Show the user the energy they've earned, and ask them if they have any outstanding questions about the mobile interface.
9. Now show the user the web interface and ask them to login and explore the site at their own leisure, all while discussing what they see or questions they may have.
10. Once the user gets to the game, give them a run through of the idea behind it and their objective.
11. Allow the users to play through a part of the game freely and run through a sample battle with them.
12. Once finished, ask the user for their ideas about the game mechanics, or if anything felt unintuitive.
13. From the homescreen, ask the user to view the leaderboards or to change their password, and observe how they navigate the website.
14. Once the user has explored all of the functionality or is finished, ask them for their final thoughts, comments, or any recommendations they may have.
15. Thank the user for their time and adjourn the test.

Usability Test Report:

Technical Levels:
High: A super-user or programmer, this user has used a terminal before and generally has a knack for computers.

Medium: The average user. Can get around a computer with little difficulty, but generally doesn't know what to do without a GUI.

Low: Inexperienced computer user. Struggles navigating GUI interfaces, can only do very basic tasks. Gets lost easily.

Gaming Expertise:
High: A hardcore gamer. Games are one of their biggest hobbies, and they play lots of games that require high skill, such as first person shooters.

Medium: This user enjoys games from time to time, but doesn't play very many hardcore titles or genres. They may own a gaming console or handheld, and may or may not identify as a gamer.

Low: A casual gamer. Generally plays phone or facebook games in their spare time. If put in front of a hardcore game, they get lost easily and don't know what to do.

Tester 1:
Gender: Female
Technical Level: Medium
Gaming Expertise: Medium-Low

Results:
➔ The user felt that the mobile end was lacking in features and thought the UI could use some more visual representations of information.
➔ The user noticed that there was nothing promoting the app on the website, and suggested to mention the cross functionality in case users found the website first.
➔ The user felt a little daunted by all of the information on the main page, and suggested more visual ways of representing this information.
➔ With her level of gaming expertise, the user felt lost during gameplay, and wanted more explanation as to the mechanics. This revealed a huge issue with the variety of user's gaming backgrounds; Those familiar with RPGs know exactly what to do when presented with the UI, whereas more casual gamers are lost. A way to bridge this gap will be required.
➔ The user was lost for a minute upon viewing the battle screen, as she didn't notice the first-person perspective and expected to see her character.

➔ The user felt that there should be a mechanic to help her lessen or avoid the enemy's attacks.
➔ The user needed more motivation for her actions, and suggested the implementation of a story or narrative to give purpose to the single player mode.

Tester 2:
Gender: Male
Technical Level: Medium
Gaming Expertise: High

Results:
➔ The user noticed that the mobile end was missing a second password entry field like the website had.
➔ The user wanted to see a display of the user's current energy so that he could easily monitor his progress.
➔ The user felt that the app needed a status or home screen as well, and was lacking in features.
➔ The user didn't know the difference between the "Play Now" button and the "Game" button on the home screen.
➔ The user also wanted more visuals on the home screen to make more sense of the text.
➔ The user loved being able to see his position on the leaderboard, and suggested adding more stats (such as sleep stats) to the leaderboard page to make it more useful.
➔ The user got confused on the map screen, and wasn't entirely sure what he was looking at. He thought he was at a particular point on the screen instead of selecting an area, which means we need to rethink this area.
➔ Because of the user's gaming background, he immediately knew what to do and how to control the game. He understood the flow of battle and how to play without any need for explanation.
➔ Felt that a tutorial or "helpful entity" would be infuriating, and he would skip it if at all possible. Suggested the frequent use of tooltips or another "on-demand" help system to ease users into gameplay.

Tester 3 (Professor Raley):
Gender: Male
Technical Level: High
Gaming Expertise: Medium-Low

Results:
➔ The user was confused at first by the energy cost associated with the attacks and thought that they might be the damage dealt. This revealed that we should include the base damage for that attack for clarity.
➔ The user noticed the lack of an experience bar in game, and suggested putting important player information on the World and Area map screens.

➜ The user needed an explanation about the use of energy as health, and thought that health was separate from energy.

➜ The first screen of both the mobile app and the website seemed unnecessary according to the user. He suggested that the login/signup could be combined with other features to save pages.

➜ The user also felt that there were a few more touches that the mobile app needed, such as the energy gained in a night of sleep. Making the screen flash red after hitting snooze would also tie the app and the game together a little more.

➜ The user also felt that either the "Game" button or "Play Now" button should be removed, as they were redundant and complicating.

➜ The user didn't feel nearly as much of a reason to play the multiplayer when compared to the single player game

Software Lexicon:

Nightmares: Dark creatures terrorizing the Hiber nation, these are the monsters that the player encounters while playing the game.

- **Solo Boss**: A smaller Nightmare that players defeat on their own for Treasure.
- **World Boss:** A powered-up version of a Solo Boss, these huge Nightmares require the cooperation of many players in order to take down.

Items:

- **Weapons:** Items that grant increased power to the wielder, Weapons may be found on the corpses of fallen Nightmares and are rewarded to those who help to vanquish World Bosses.

Attack: Physical strike by the player that uses the weapon's attack modifier to attack a Nightmare.

Spells: Magical strike by the player that uses the weapon's magic modifier to attack a Nightmare.

Energy: The player's main resource, Energy is gained by use of the partner iOS application to track the player's (real-world) sleep. Energy is used both as the player character's "health" stat and as a "mana" for using stronger Attacks and Spells.

Maps:

- **World**: The full map of the Hiber nation, the player clicks on smaller Areas within the World Map to find appropriately-leveled Nightmares to fight.
- **Area**: A subset of the World Map, the Area Map gives the player several choices of Nightmares to choose from within an area-specific level range.

Leaderboard: A table listing the top 10 players of Night Knights with their Knight Name, Level, and current Experience. Players can also see how they stack up against those Knights ranked immediately above or below themselves.

Encounter: A turn-based battle between a player and a Nightmare.

Treasure: Items gained by a player after successfully defeating a Nightmare in an encounter. Treasure can be in the form of Experience or a Weapon.

Experience: Granted for victory in an Encounter, accumulating enough Experience points will raise a player's Level. Used for calculating a player's rank in the leaderboards.

Level: A quantized number based on total accumulated Experience. New attacks and spells are unlocked by reaching certain Levels.

Level Up: The act of earning enough Experience to reach the next Level.

Turn: A round in an Encounter in which the player makes a decision to attack with a physical Attack or with a Spell (or run away from the Encounter).

Appendix A:

Night Knights Data Model