Twenty questions for our sponsor:

1. Our advisor mentioned the app was supposed to be like a game so should there be challenges in the app?
2. Should the app be more of a model or more of a game?
3. Should the app be cross platform?
4. Should the app be a website, accessible from a phone?
5. Do you have anything in mind regarding style of graphics?
6. Do you know what parts of the body the program should model?
7. Do you want the app to work without wifi access?
8. Should this be a web app or a mobile app?
9. Should this be available on the app stores, or just a tool for GU students?
10. Is the game something to be used inside the class or outside the class or both?
11. What are the most important things you would like our app to model?
12. Should the app be more visual (mostly graphics) or word based?
13. What is the goal for the outcome of this project?
14. Do you want the graphics to be more realistic looking?
15. Are there any specific ways in which you model things in class that we should incorporate into our app?
16. Are there any specific ideas you have for how the interface should work? Drag and drop or sliders?
17. Are there any specific images/logos you want to add into the app?
18. Do you want to see the progress of each student in the app? Do you want the students to have accounts?
19. Is there anyone other than yourself that we can run ideas by? Beta testing?
20. How do you anticipate this app will be used in your class?

Top 5:

Do you want the app to cross platform (i.e. ios, android, windows)? Should this be a mobile app or a web app? Should the app be web based?

Are there any ideas you have for the style of the app? Do you have ideas for what the graphics should look like? Do you want the app to be primarily visual with very few words?

Do you have any specific ideas for what you would like our app to model? What part of the body should we be modeling? How many different scenarios would you like to be modeled?

What is the overarching goal that you have for this project? How do you hope for this app to be used in your class?

Would you like to see the progress of each student in the app? Would you like the students to create accounts on the app that you’d be able to monitor?

Tasks:

1. (Kayla) Look into tools for cross platform development? i.e. look at apache cordova, phone gap, a web based app, etc. Try to find tools that are free and commonly used.

**Results:**

As we will likely need our app to be platform independent it is important that we find a way to do this that won’t require us to develop a separate app for each environment. Therefore, a native app is not ideal.

A web application will likely be a better match. To do this we will need to develop our app using HTML5 and JavaScript. Technologies like Apache Cordova and PhoneGap might be good tools to help us create this web app. The downside is that a web app will be more like a website viewed on a phone and will require a decent internet connection to run.

Another option would be a cross-platform application which we can develop using tools like Xamarin, React Native, Appcelerator, or NativeScript. Doing this we would need to make some customizations for each platform but we’d be able to reuse about 80% of our code.

Ideally, the cross-platform would be the better option, but depending on time a

web app would be a good backup.

1. (Garett) Search app store or internet for other apps that model biochemistry processes. Try to determine what development tools they used (i.e. graphics library, api, etc.)

**Results:**

There are many applications out there that teach biochemistry, but all of them are nowhere near what we are planning for our end product. Most being very old and using somewhat outdated graphics libraries that are really just glorified quizzes.

There are some nice drag and drop games that have a few of the features that we may want in our final product. Such as one application was an interactive DNA synthesis game where the user would set up the DNA to be synthesized, yet was very clunky and didn’t have much user interaction. I have found very few applications that implement anything near what we are tasked with so we will be breaking some new ground here. The graphics libraries that they use do not appear to be what we want to be using, we will potentially need partial physics in order for the game to work and none of the games I found have this. We can take some concepts off of these games but almost everything we are doing will be new.

1. (Kaylee) Look into different databases we may be able to use, starting with firebase. Focusing on databases that would allow us to create user accounts and have admin accounts.

What we need for a database for mobile app development.

* Lightweight as storage is limited on mobiles
* Fast and secure
* No server requirement
* Low memory and power consumption
* Easy to use

**Firebase** is a common database for Mobile app development. It works for IOS, Android, and Web development. We can start Firebase for free and then it has a pay as you go. This also allows step by step walk throughs on all the platforms (IOS, Android) Overall, this real time database is very user friendly and allows admin accounts.

**SQLite** supports IOS, Android, as well as Blackberry and Windows. The database file is a single memory file so it is fast and needs less memory to operate. 20 records/sec

**Realm DB** Data can be queried, filtered, and interconnected. Specified for mobile devices. Objects always stays in sync. Faster then SQLite 57 records/sec. has secured and transparent encryption/decryption Available on android, IOS, JavaScript. Overall, Realm DB is faster and has more advantages then SQLite

**Berkley DB** Open source high performance db and can be used in so many languages. It is faster then SQLight but bulkier because of all the features.

1. (Stephen) Research different graphics libraries we may be able to use, looking for libraries that are good for game-like apps. Should we use a 2d or 3d graphics library? Look for graphics libs with good documentation and tutorials.

**Results:**

There are various graphics libraries available for development in iOS, Android, and web development. Although we are not certain yet whether the sponsor wants an app that uses 2D or 3D graphics, the best graphics library options include the ability to do either. Therefore, the best plan for the graphics would be to create an app that uses 3D graphics as that provides the best experience for the user.

The best library for iOS development seems to be the Metal library. It is commonly used in game development although probably has more intense graphics than we need. On the other hand, the SceneKit library has built-in physics and a particle generator and is therefore probably closer to what we would need for this project.

For Android development, libGDX is a java library that is based on OpenGL and can also be used in webpages, on windows, on MacOS, and on iOS. While this is not the best choice for iOS development, it is a very useful library for cross-platform development and is likely the best choice overall.

For web development, webGL is a very useful tool that has good documentation. It is also the library being used in the graphics class this semester and will likely be the one with which our group is most familiar.