Criterion A: Planning

Defining the Problem

The client (myself) wants to create a software solution that solves projectile motion problems. In most cases, projectile motion problems can have multiple steps, making it easy for mistakes to occur. Additionally, it can also be difficult to determine where to start with different projectile motion problems. The development of a software that solves projectile motion problems will increase the client's (my) understanding of projectile motion and create an easy way to compare and check solutions to different projectile motion problems.

Rational for Solution

The client (myself) needs to develop a software that can solve any type of projectile motion problem. The solution needs to be easy to understand, simple to use, and be able to run on most computers.

Many online projectile motion calculators exist; however, they cannot be accessed without an internet connection and may be blocked by some schools. Moreover, these calculators are not able to do everything that deals with projectile motion, which makes them time consuming and inefficient to use. The best solution to this problem would be to create an application that addresses the client's (my) criteria and that is easily accessible and simple to understand and use.

The solution will be coded using java as java is compatible with multiple computer systems, and because java is the primary language for the AP Computer Science A course and exam.

Success Criteria

1. The application can correctly calculate the range, maximum height reached, total time of flight, the initial height, the initial velocity, and the angle of launch from a given set of knowns.
2. The application can correctly calculate the instantaneous velocity, the x and y components of that velocity, the instantaneous height (y), and the instantaneous distance (x) of the projectile from the point of launch at a given time.
3. The application can display the path of the ball while it is in the air. In other words, a graph of the ball's motion can be shown.
4. The application can determine if it cannot solve all the required variables in criteria one.
5. The application is clear and easy to understand and use.