Pseudocode for Function1.java extends Function

* answerString(double, double, double, double) method
  + Return the minimum time, minimum running distance, and minimum swimming distance as a string
* fnValue(double) method
  + Check if x is less than or equal to 0, which it shouldn’t be because x is time and time is not negative.
    - If it is, return the max possible value for a double
    - If it’s not, return the minimized function: return (x / 8) + ((sqrt((6 – x) ^ 2 + 4)) / 3)
* getXVal(double) method
  + Return x because it’s just the regular x value
* getYVal(double) method
  + Return sqrt((6-x)^2 + 4) because that’s how you get the time spent swimming
* getZVal(double) method
  + Return 0 as it’s unused.
* toString() method
  + Return a description of the problem you are solving, so for this minimizing the amount of time it will take to get to the island

Test plan:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test Case #** | **Input** | **Expected Output** | **Actual Output** | **Did the test pass?** |
| 1 | Left extent: 0  Right extent: 6 | Time: 1.37 hours  Swim Distance:  2.16 mi  Run Distance:  5.19mi | Same as expected | Yes |
| 2 | Left Extent: 0  Right Extent: 10 | Time: 1.37 hours  Swim Distance:  2.15mi  Run Distance:  5.20 miles | Same as expected | Yes |
| 3 | Left Extent: 0  Right Extent: 3 | Time: 1.58  Swim Distance:  3.61  Run Distance:  2.99 | Same as expected | Yes |

Screenshots:

A screenshot of a cell phone

Description automatically generatedA screenshot of a cell phone

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UML Class Diagram for Function1.java

A screenshot of a cell phone

Description automatically generated

Lessons Learned:

I learned how important it was to use optimization problems and how calculus can be applied in the real world. This is a niche example, but when you’re working with NASA and they want to use the least amount of fuel possible in a rocket due to insane fuel costs, it is very important that you can do optimization problems.

I had an issue where I didn’t understand when the project was referring to Lab11. It seems that the Lab was not made available at first, or if it was, it was quickly taken down by accident, so I was very confused on what was wanted with some of the other methods, moving from Lab10 to Assignment 6. Once I did Lab11, Assignment 6 became a piece of cake.