Test Planning

List of system level overall requirements that the program should satisfy:

- R1: The formulas should be correctly implemented with displayed input fields being assigned to correct variables of the formulas, ensuring correctness and reliability of the program.
- R2: The program needs to check user input validity in some way to not allow the program to break. This is to make sure the program still works without interruption even if an incorrect input is provided like a non-number character in a field that only accepts numbers, satisfying data validation and error handling.
- R3: The formulas that have division in them must not break the program when provided with zero as divisor, in order to not break the program like how it is mentioned in R2.
- R4: If a calculation is made on one of the chosen options, then the result of that calculation should stay present on the result section until the program is closed or a new calculation is made. This is to make sure even if users use the “Return back to main menu” button to go back to the main menu and use different formula options to calculate new variables, they can still go back and check both their inputs and outputs for a previous specific formula if they have to use multiple formulas on the system for a particular question they are working on as an example, increasing the level of usability and efficiency of the program as well as satisfying effective navigation with the user interface.

Priority and prerequisites

- R1 is a requirement that can be verified with unit testing and is the requirement with the highest priority on the list above, therefore most of the testing resources, especially test writing, should be devoted to this requirement.
- R2 and R3 are requirements that are connected to each other and have a lesser priority than R1 because usually the variables that are present in the calculation to be done are going to give a valid solution since it is expected from the user to provide valid inputs in the first place, therefore these should have a lesser priority than confirming whether the calculations are correct overall or not.
- R4 is a requirement that is related to integration and system testing due to its usage of the graphical user interface, therefore it has lesser priority than all the other requirements that precede it since it is a higher level case to be tested compared to the rest, and more related to qualitative requirements such as usability and user experience.

Scaffolding and instrumentation

- R1's unit tests need valid sample data in order to check whether the calculations are correct or not, this can be done in two ways for each formula option available on the program:
    - One where predetermined sample data is given for the assertion of a result from a valid example of the use of that formula
    - One where randomly generated valid inputs provide a valid assertion
- The testing for the other requirements R2, R3 and R4 do not need the same level of scaffolding and instrumentation as R1 since their implementation and validation are part of the development process and can be tested more effectively for real world scenarios using user based black box testing approaches such as functionality and usability testing.

Process and risk

- R1's testing process is the most time consuming process among all the overall system requirements because every function needs to have their own individual tests conducted.
- R2, R3 and R4's testing implementations are less extensive and time consuming than R1 because their validation is implemented inside the codebase during the development with error handling therefore they rely more on user based black box testing approaches such as functionality and usability testing.