e) Develop a collection of requirements based tests to:
- Improve the requirements in your requirements document
- Form the basis for the testing effort during implementation.
- Use the following template for your test cases:

- **Requirement ID:** Unique identifier
- **Requirement Description:** The requirement, followed by its specification.
- **Rationale:** Context that explains why this requirement was included.
- **Inputs:** If this is a functional requirement that describes an operation, describe the input that must be provided.
- **Outputs:** If this is a functional requirement that describes an operation, describe the output that must be provided.
- **Persistent Changes:** If this is a functional requirement that describes an operation, describe any changes to system state that will persist following this operation.
- **Related Requirements and Use Cases:** Refer to the IDs of any related requirements or use cases.
- **Test Cases:** Tests that can be used to show that the requirement is met.

Requirement ID: R1
Requirement Description: App Operation, must allow student to select which operation they would like.
Rationale: On the main page of the application, the student has multiple choices on what they would like to do.
Outputs: Opens the operation that the user selected.
Persistent Changes: None.
Related Requirements and Use Cases: None.
Test Cases: User selects an operation. If selected operation is opened, the requirement has been met. If it is not opened, the requirement has not been met.

E.1.1.1 Go to Selected Operation

Description:	Checks that the user is redirected to the correct operation page
Test Inputs:	Selecting Schedule Generator, Route Generator, GPA Calculator, and Final Exam/Project Grade Calculator and clicking 'Go,' to test each operation.
Expected Results:	The user is redirected to the selected operation. No exception is thrown.
Dependencies:	None
Initialization:	The user is already in the application.
Test Steps:	1. Select the operation from the drop down list. 2. Click the 'Go' button. 3. Verify that the redirected operation page matches the selection.

Requirement ID: R2
Requirement Description: Schedule generator must generate the possible schedule(s) based on the user's course selections.
Rationale: The main objective of the application is to help generate a color coded student schedule.
Outputs: Possible schedules the student can pick from that provide the CRNs, which the student can use to input into the registration worksheet.
Persistent Changes: None.
Related Requirements and Use Cases: R1, Schedule Generator Use case.
Test Cases: User selects an operation. If selected operation is opened, the requirement has been met. If it is not opened, the requirement has not been met.

E.2.1.1 Generate Schedule

Description:	Checks that generate schedule operation page is performing correctly.
Test Inputs:	Select Class type CSC (computer science), then the Course 2720 (Data Structures), 3210 (Computer Org & Programming), and 3320 (System-Level Programming).
Expected Results:	A list of possible schedule(s) are generated with the Course ID, Course Name, CRN, Day(s), Time, Location, and Professor of each course.
Dependencies:	There are no scheduling conflicts with the class choices.
Initialization:	The user has been redirected here from the Main Page.
Test Steps:	1. Select the Subject, Computer Science. 2. Select Course numbers 2720, 3210 and 3320. 3. Select Generate Schedules. 4. Verify that possible schedule(s) generated have no time conflicts.

Requirement ID: R3
Requirement Description: Route Generator, must generate the route between the two locations that the user selects.
Rationale: The student must receive the correct route to get to class.
Outputs: Route generate through the Google Maps API.
Persistent Changes: The Map state changes to reflect the route.

Related Requirements and Use Cases: R1, Class Route Generator Use case.
Test Cases: User selects their beginning location and the destination location. Check to see if the route generated matches the selected locations.

E.3.1.1 Generate Route

Description:	Checks that the correct routes are generated between locations.
Test Inputs:	Select Location 1 and all other locations. Repeat for each Location.
Expected Results:	The route between Location 1 and Location 2 is generated. No exception is thrown except when the values selected are the same location.
Dependencies:	The Google Maps API is working.
Initialization:	The user has been redirected from the Main Page.
Test Steps:	1. Select Location 1. 2. Select Location 2. 3. Select Generate Route. 4. Verify that the route generated is from Location 1 to Location

Requirement ID: R4
Requirement Description: GPA Calculator. The GPA Calculator will allow the student to simulate certain scenarios in regards to the grade letter they choose and the weight of the class, which should be included with the class name, and the amount of classes to then calculate a GPA for the student.
Rationale: We believe that this is a high-priority requirement for the Schedule Builder, because students check their GPA often, and this will be a frequently used feature of the Schedule Builder.
Outputs: The student's GPA.
Persistent Changes: None.
Related Requirements and Use Cases: GPA Calculator Use case
Test Cases:

E.4.1.1 Calculate the student's GPA

Description:	Checks that the correct GPA is calculated based on inputs.
Test Inputs:	Weight of the class, letter grade like A, B, C, D, F; we may incorporate pluses and minuses, time permitting.
Expected Results:	The GPA.

Dependencies: None.

Initialization: The user has been redirected from the Main Page.

Test Steps:
1. Input current institutional GPA.
2. Input current amount of credit hours completed.
3. Input Weight of the class(es) and their corresponding letter grade.
4. Verify the calculator has the correct output.

Requirement ID: R5
Requirement Description: Final grade Calculator. The Final grade Calculator will allow the student to simulate what grade they need on a final project/exam, in regards to the final grade they want to receive.
Rationale: Students are often worried about if they are going to pass a course and what grade they have to receive on a final project or grade often has a big impact on their final grade.
Outputs: The grade the student needs to receive on the final project/grade in order to get their desired grade.
Persistent Changes: None.
Related Requirements and Use Cases: Final Grade Calculator Use case.
Test Cases:

E.3.1.1 Calculate the student's final grade needed to pass a course

Description: Checks that the the grade generated is lowest grade a student can recieve to pass the course with a certain grade.

Test Inputs: Weight of the grades for such as Assignments, Quizzes, Tests, and Final Exam, the grades they have received, and their desired final grade.

Expected Results: The lowest possible grade the student can receive to pass with the desired grade.

Dependencies: None.

Initialization: The user has been redirected from the Main Page.

Test Steps:
1. Input the weight for each part of the final grade components.
2. Input the corresponding grades.
3. Input the desired final grade.
4. Verify the calculated grade will achieve the final grade.