# Introduction

Learning programming language is little bit tougher however graphical representation help to make the programming easier to understand. As a part of my assignment for Software Engineering taught by Resham Pun Magar, I have created a simple graphical programming language where user can write a certain line of code to create different geometrical shape and functionality.

# Snapshot of Graphical Programming Language:

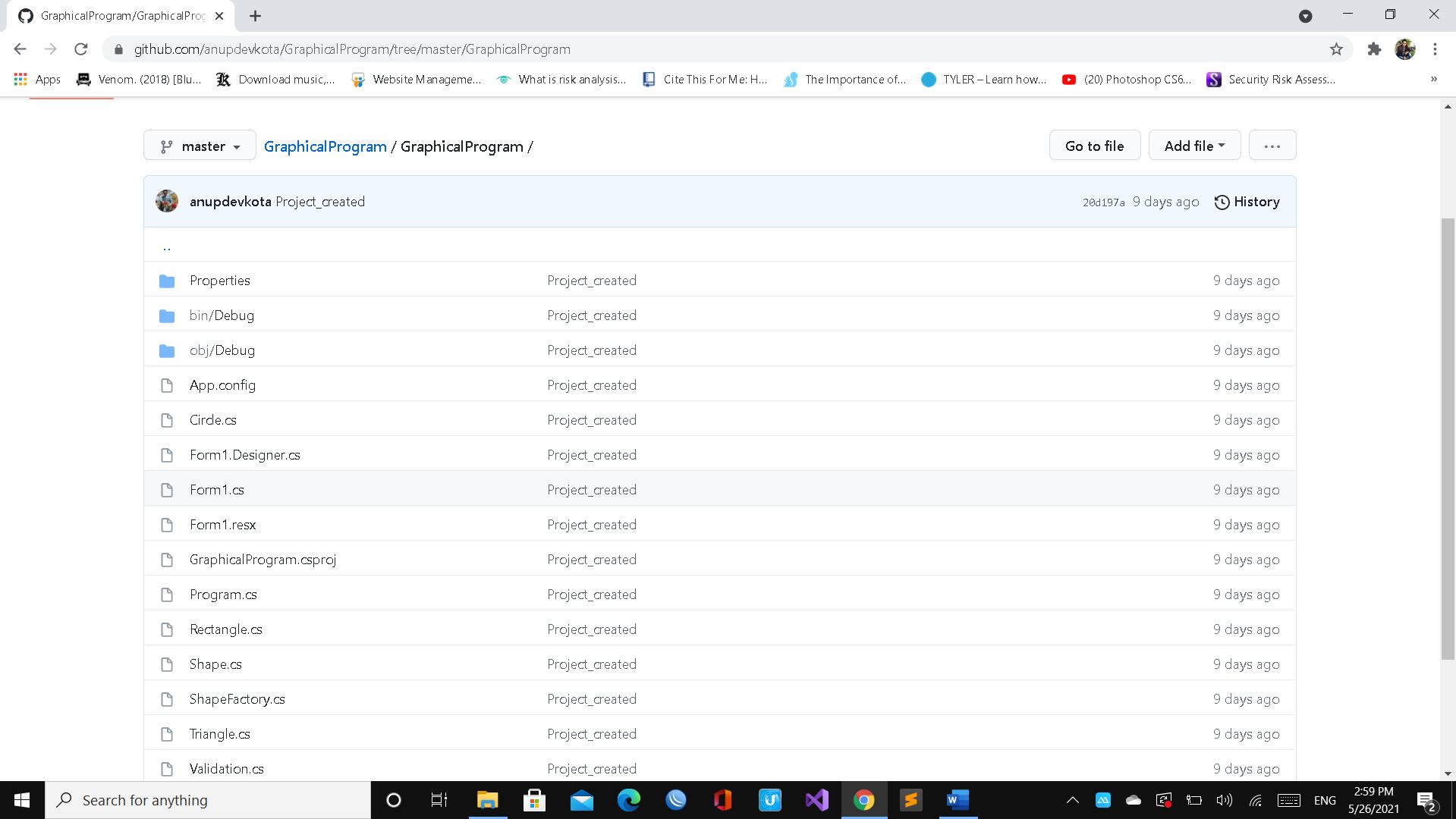
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| **Screenshot** | **Description** |
|  | Home Page |
|  | Creating graphics rectangle with command |
|  | Creating graphics circle with command |
|  | Creating graphics triangle with command |
|  | Creating Graphics with “**drawto**” command |
|  | Creating Graphics with “**moveto**” command |
|  | Saving functionality for further use |
| **­­­** | Load functionality of the save code |

Command that are use to represent the above graphical program:

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| **Command** | **Description** |
| Moveto <value1>, <value2> | Command to move pen position |
| Rectangle <width>, <height> | Command to draw circle |
| If statement | Command use to draw circle with counter |
| Loop | Command use to draw circle looping up to certain number |
| Save and Load | Function to save the lines of code and re-use them more |
| Reset & Clear | Command to reset the present graphics |
| Run | Command to execute single line command |
| Execute | Command to run multiple line of code |

# Version Control

For the version control I have used GitHub with my username “anupdevkota” where I have created a repository GraphicalProgram and keep record of the progress of my project.



# Testing:

Software Testing is a strategy to check whether the actual software product coordinates with expected requirements and to guarantee that software product is defect free. It includes execution of programming/framework segments utilizing manual or computerized devices to assess at least one properties of interest. The reason for software testing is to recognize errors, gaps or missing requirements in contrast to actual requirements.

There are three types of software testing approaches

**1. White box testing:** It is conducted to test program and its implementation, in order to improve code efficiency or structure. It is also known as ‘Structural’ testing. In this testing method, the design and structure of the code are known to the tester. Programmers of the code conduct this test on the code. This testing is usually done at the unit level.

**2. Black Box Testing:** It is carried out to test functionality of the program. It is also called ‘Behavioral’ testing. The tester in this case, has a set of input values and respective desired results. On providing input, if the output matches with the desired results, the program is tested ‘ok’, and problematic otherwise. In this testing method, the design and structure of the code are not known to the tester, and testing engineers and end users conduct this test on the software.

**Testing Levels:**

**Unit Testing:**  Unit Testing is done to check whether the individual modules of the source code are working properly. i.e. testing each and every unit of the application separately by the developer in the developer’s environment. It is AKA Module Testing or Component Testing

**Integration Testing:** Integration Testing is the process of testing the connectivity or data transfer between a couple of units tested modules. It is AKA I&T Testing or String Testing. It is subdivided into Top-Down Approach, Bottom-Up Approach and Sandwich Approach (Combination of Top Down and Bottom Up).

**System Testing:** It’s a black box testing. Testing the fully integrated application this is also called as end to end scenario testing. To ensure that the software works in all intended target systems. Verify thorough testing of every input in the application to check for desired outputs. Testing of the user’s experiences with the application.

**Unit testing setup**

For the unit testing of my project I have used MSTest in visual studio under my project.

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| **Snapshot** | **Description** |
|  | To start unit testing, under the solution explorer of my project I have right click and add new project |
|  | After that I have create a new project MsTest with name UnitTestProject |
|  | I have done testing for two element I have been using in my project i.e. rectangle and triangle. |
|  | When I have run my test then the result outcome is passed as shown in beside figure. |

Unit testing

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| **Test Case ID** | | | | 001 | **Test Case Description** | | | Unit testing of an Graphical programming | | | | | | |
| **Created By** | | | | Anup | **Reviewed By** | | | British College | | **Version** | | | 1.0.0 | |
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| **QA Tester’s Log** | | | | Review comments from British college | | | | |  |  |  | |  |  |
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| **Tester’s Name** | | | | Anup | **Date Tested** | | | 16th- May 2021 | | **Test Case (Pass/Fail/NOT)** | | | Pass | |
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| **S#** | | **Prerequisites** | | | | |  | **S#** | | **Test Data** | | | | |
|  | |  | | | | |  | 1. | | var r = new GraphicalProgram.Rectangle();  int x = 200, y = 200, size = 100, size1 = 100;  r.set(texturestyle, bb, c1, x, y, size, size1);  Assert.AreEqual(200, r.x); | | | | |
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| **Test Scenario** | | New object of project GraphicalProgram is created and the two side of rectangle is provided | | | | | | | |  |  | |  |  |
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| **Step #** | **Step Details** | | **Expected Results** | | | **Actual Results** | | | | | | **Pass/Fail/Not executed/suspended** | | |
| **1** | Click on debug | | Debug should be completed | | | As Expected | | | | | | Pass | | |
| **2** | Click on run all test | | Test should be completed without any error | | | As Expected | | | | | | Pass | | |
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Black Box Testing

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| **Test Case ID** | | | | 001 | **Test Case Description** | | | Test the Function in Graphical programming application | | | | | | |
| **Created By** | | | | Anup | **Reviewed By** | | | British College | | **Version** | | | 1.0.0 | |
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| **QA Tester’s Log** | | | | Review comments from British college | | | | |  |  |  | |  |  |
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| **Tester’s Name** | | | | Bibek | **Date Tested** | | | 16th- May 2021 | | **Test Case (Pass/Fail/NOT)** | | | Pass | |
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| **S#** | | **Prerequisites** | | | | |  | **S#** | | **Test Data** | | | | |
|  | |  | | | | |  | 1. | | Moveto 194,194 | | | | |
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| **Test Scenario** | | By using move to the user can move the circle to X=194 and Y=194 coordinates from initial state | | | | | | | |  |  | |  |  |
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| **Step #** | **Step Details** | | **Expected Results** | | | **Actual Results** | | | | | | **Pass/Fail/Not executed/suspended** | | |
| **1** | Open Graphical programming application | | Application should open | | | As Expected | | | | | | Pass | | |
| **2** | Enter the command | | Text can be entered | | | As Expected | | | | | | Pass | | |
| **3** | Click execute | | Position of the circle should be changed | | | As expected | | | | | | Pass | | |
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| **Test Case ID** | | | | 002 | **Test Case Description** | | | Test the Function in Graphical programming application | | | | | | |
| **Created By** | | | | Anup | **Reviewed By** | | | British College | | **Version** | | | 1.0.0 | |
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| **QA Tester’s Log** | | | | Review comments from British college | | | | |  |  |  | |  |  |
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| **Tester’s Name** | | | | Bibek | **Date Tested** | | | 16th May 2021 | | **Test Case (Pass/Fail/NOT)** | | | Pass | |
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| **S#** | | **Prerequisites** | | | | |  | **S#** | | **Test Data** | | | | |
|  | |  | | | | |  | 1. | | Circle 80 | | | | |
|  | |  | | | | |  |  | |  | | | | |
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| **Test Scenario** | | Circle command to draw circle | | | | | | | |  |  | |  |  |
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| **Step #** | **Step Details** | | **Expected Results** | | | **Actual Results** | | | | | | **Pass/Fail/Not executed/suspended** | | |
| **1** | Open Graphical programming application | | Application should open | | | As Expected | | | | | | Pass | | |
| **2** | Enter the command | | Text can be entered | | | As Expected | | | | | | Pass | | |
| **3** | Click run | | Circle should be drawn | | | As expected | | | | | | Pass | | |
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| **Test Case ID** | | | | | | 003 | **Test Case Description** | | | | Test the Function in Graphical programming application | | | | | | | |
| **Created By** | | | | | | Anup | **Reviewed By** | | | | British College | | **Version** | | | | 1.0.0 | |
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| **QA Tester’s Log** | | | | | | Review comments from British college | | | | | |  |  |  | | |  |  |
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| **Tester’s Name** | | | | | | Sabin | **Date Tested** | | | | 16th May 2021 | | **Test Case (Pass/Fail/NOT)** | | | | Pass | |
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| **S#** | | | **Prerequisites** | | | | | | |  | **S#** | | **Test Data** | | | | | |
|  | | |  | | | | | | |  | 1. | | Clear | | | | | |
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| **Test Scenario** | | | Entering valid command and using clear command to clear the working panel | | | | | | | | | |  |  | | |  |  |
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| **Step #** | **Step Details** | | | **Expected Results** | | | | | **Actual Results** | | | | | | **Pass/Fail/Not executed/suspended** | | | |
| **1** | Open Graphical programming application | | | Application should open | | | | | As Expected | | | | | | Pass | | | |
| **2** | Enter rectangle and its value | | | Text can be entered | | | | | As Expected | | | | | | Pass | | | |
| **3** | Click run | | | Rectangle should be drawn | | | | | As expected | | | | | | Pass | | | |
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| 4 | | Enter clear command | | | Text can be entered | | | As expected | | | | | | | | Pass | | |
| 5 | | Click run | | | Panel should be cleared | | | As expected | | | | | | | | Pass | | |
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| **Test Case ID** | | | | 004 | **Test Case Description** | | | Test the Function in Graphical programming application | | | | | | |
| **Created By** | | | | Anup | **Reviewed By** | | | British College | | **Version** | | | 1.0.0 | |
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| **QA Tester’s Log** | | | | Review comments from British college | | | | |  |  |  | |  |  |
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| **Tester’s Name** | | | | Niraj | **Date Tested** | | | 16th May 2021 | | **Test Case (Pass/Fail/NOT)** | | | Pass | |
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| **S#** | | **Prerequisites** | | | | |  | **S#** | | **Test Data** | | | | |
|  | |  | | | | |  | 1. | | Counter = 10  If counter = 10 then  Circle 60  endif | | | | |
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| **Test Scenario** | | Verifying conditional statement is working | | | | | | | |  |  | |  |  |
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| **Step #** | **Step Details** | | **Expected Results** | | | **Actual Results** | | | | | | **Pass/Fail/Not executed/suspended** | | |
| **1** | Open Graphical programming application | | Application should open | | | As Expected | | | | | | Pass | | |
| **2** | Enter the conditional statement | | Text can be entered | | | As Expected | | | | | | Pass | | |
| **3** | Click execute | | User can use condition in statement | | | As expected | | | | | | Pass | | |
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| **Test Case ID** | | | | 005 | **Test Case Description** | | | Test the Functionality in Graphical programming application | | | | | | |
| **Created By** | | | | Anup | **Reviewed By** | | | British College | | **Version** | | | 1.0.0 | |
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| **QA Tester’s Log** | | | | Review comments from British college | | | | |  |  |  | |  |  |
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| **Tester’s Name** | | | | sabin | **Date Tested** | | | 16th May 2021 | | **Test Case (Pass/Fail/NOT)** | | | Pass | |
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| **S#** | | **Prerequisites** | | | | |  | **S#** | | **Test Data** | | | | |
|  | |  | | | | |  | 1. | | radius = 10  Loop 25  radius + 10  Circle radius  endloop | | | | |
|  | |  | | | | |  |  | |  | | | | |
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| **Test Scenario** | | Verifying loop statement is working | | | | | | | |  |  | |  |  |
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| **Step #** | **Step Details** | | **Expected Results** | | | **Actual Results** | | | | | | **Pass/Fail/Not executed/suspended** | | |
| **1** | Open Graphical programming application | | Application should open | | | As Expected | | | | | | Pass | | |
| **2** | Enter the conditional statement | | Text can be entered | | | As Expected | | | | | | Pass | | |
| **3** | Click execute | | User can use loop in program | | | As expected | | | | | | Pass | | |
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| **Test Case ID** | | | | 006 | **Test Case Description** | | | Test the Function in Graphical programming application | | | | | | |
| **Created By** | | | | Anup | **Reviewed By** | | | British College | | **Version** | | | 1.0.0 | |
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| **QA Tester’s Log** | | | | Review comments from British college | | | | |  |  |  | |  |  |
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| **Tester’s Name** | | | | Anup | **Date Tested** | | | 16th May 2021 | | **Test Case (Pass/Fail/NOT)** | | | Pass | |
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| **S#** | | **Prerequisites** | | | | |  | **S#** | | **Test Data** | | | | |
|  | |  | | | | |  | 1. | | Circle anup | | | | |
|  | |  | | | | |  |  | |  | | | | |
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| **Test Scenario** | | Invalid command should be error | | | | | | | |  |  | |  |  |
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| **Step #** | **Step Details** | | **Expected Results** | | | **Actual Results** | | | | | | **Pass/Fail/Not executed/suspended** | | |
| **1** | Open Graphical programming application | | Application should open | | | As Expected | | | | | | Pass | | |
| **2** | Enter the conditional statement | | Text can be entered | | | As Expected | | | | | | Pass | | |
| **3** | Click run | | Command should not be executed | | | As expected | | | | | | Pass | | |
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| **Test Case ID** | | | | 007 | **Test Case Description** | | | Test the Function in Graphical programming application | | | | | | |
| **Created By** | | | | Anup | **Reviewed By** | | | British College | | **Version** | | | 1.0.0 | |
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| **QA Tester’s Log** | | | | Review comments from British college | | | | |  |  |  | |  |  |
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| **Tester’s Name** | | | | Anup | **Date Tested** | | | 16th May 2021 | | **Test Case (Pass/Fail/NOT)** | | | Pass | |
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| **S#** | | **Prerequisites** | | | | |  | **S#** | | **Test Data** | | | | |
|  | |  | | | | |  | 1. | | Radius = 20  Loop = 20  Circle + 5  Circle radius  endloop | | | | |
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| **Test Scenario** | | Invalid command (loop = 20 ) should be error | | | | | | | |  |  | |  |  |
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| **Step #** | **Step Details** | | **Expected Results** | | | **Actual Results** | | | | | | **Pass/Fail/Not executed/suspended** | | |
| **1** | Open Graphical programming application | | Application should open | | | As Expected | | | | | | Pass | | |
| **2** | Enter the conditional statement | | Text can be entered | | | As Expected | | | | | | Pass | | |
| **3** | Click run | | Command should not be executed | | | As expected | | | | | | Pass | | |
|  | | | | | | | | | | | | | | |