**Program Development Plan Including Test Phases**

**Team: It’s an Algorithm!**

**Group Members:**

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**Program: FactFun Math Tutor**

This is the test plan for Team It’s an Algorithm! in which we will outline specific test cases to be executed by testers of our FactFun project. We are currently testing using Version 14.

**Program Development Plan Including Test Phases:**

1. Initial Build: Beginning Algorithm completed; first versions of program built; PowerPoint presentation

Algorithm and Powerpoint available on [GitHub](https://github.com/cookiedancer/its-an-algorithm/tree/master).

(Completion Date: Feb 17, 2016)

1. Internal Test Phase: Group members will run different cases and modify the program accordingly.

Test Cases attached below

(Completion Date for Initial Build: April 6, 2016)

1. User Test Phase:Students from St. Gregory the Great’s Middle School Coding Club will be testing the program. Ideally, there will be between 4 and 10 students and testing will be completed between 4/7/16 and 4/12/16.

Test Cases attached below

(Completion Date: )

1. Second Build: to add in Animation will begin Feb 17, 2016 and is scheduled to conclude April 30, 2016

To be posted to GitHub

(Completion Date: )

1. Final Build : Final program version in response to testing feedback, scheduled to conclude May 11, 2016

To be posted to GitHub

(Completion Date: )

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| **2. Internal Test Phase for Math FactFun** | | | |  |  |
| Reason for  Test Case | Input Values | Expected Outcome | Observed Output | Pass/Fail | Resolution |
| Numerical Value in Words (Michelle) | The answer to the prompted question typed out in word form (ie. 7x7 = forty-nine) | You must enter a number. Try again. | You must enter a number. Try again. | Pass | None needed |
| An answer with a space at the end.(Michelle) | The answer to the prompted question with a space at the end (ie. 7x7 = 49\_) | Accepted answer because the program ignores spaces in the response. | Correct response :) | Pass | None needed |
| An answer with a space or spaces at the beginning.(Michelle) | 7x7= 49 | Accepted answer because the program ignores spaces in the response. | Correct response. | Pass | None needed |
| Putting a number instead of y or n (Tonya) | 6 instead of y | Error message | Program failed  Update: now works | Fail  Now Pass | Added a while loop to ask for the entry of a y or n, included an cin.ignore statement so that it only prints line out once |
| Failing to hit the enter key after typing an answer (Tonya) | nothing | nothing | The computer just sits waiting for input  Update: now works | Fail  Now Pass | Added a cout to add the instruction to hit enter after each response at the beginning of the program |
| Adding a period or some other stray letter or symbol after the numerical answer (Eva) | 49. Or 49o | Error message | If the first numbers are the correct answer the program identifies it as correct no matter what comes after | fail |  |
| Adding a period or some other stray letter or symbol before the numerical answer (Eva) | .49 or e49 | You must enter a number. Please try again. | You must enter a number. Please try again. | Pass | None needed |
| Entering both y and n when asked to enter y or n (Tonya) | Either yn or ny | Request to enter y or n again | Correct output | Pass | None needed |
| Enter another letter instead of y or n the end or repeat the program.(James) | D, s I l, x | Should end program anyways, due to the computer not getting a y to repeat. | Program just ends because it did not get a valid input, which is good meaning the user is not being serious about learning. | pass | I think this bug is not necessarily a terrible thing, not all bugs are bad ;) |
| Entering a string of characters, special characters and number to introduce the infinite output loop(James) | 1^^fd!13d | Because the program should ignore up to 100 characters, then this should not work. | Infinite Outward loop introduced, mental breakdown occurs in user due to frustration. | FAIL again... | We need to limit the input more so, to restrict all the possibilities down to the least that we can. |
| (version 12) entering letters, symbols and numbers(Joseph) | 5/.;sa | Invalid input | Infinite loop | fail |  |
| Entering decimals(Joseph) V9 | 56.2 | Incorrect answer | Infinite loop | fail |  |
| Entering anything else instead of a y or n | dd898eah9899w | You did not enter y or n. Please type y or n and hit the Enter key | You did not enter y or n. Please type y or n and hit the Enter key | Pass |  |

**3. User Testing Phase**

**Test Case 1:**

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| **Test Scenario** | Student is ‘good’ at their math facts. |
| **Test Case** | Student accurately answers 5 consecutive questions, then exits the program. |
| **PreConditions** | * Student accesses code via an online compiler (cpp.sh) * Student knows their multiplication facts or is provided with a calculator for testing purposes. |
| **Test Step(s)** | 1. Student runs the program using cpp.sh 2. Student accurately answers the first prompted math fact problem 3. Student answers ‘y’ or ‘Y’ when prompted to complete another problem 4. Student repeats steps 2 and 3 a total of 5 times, choosing no after solving the 5th problem by entering ‘n’ or ‘N’ when prompted. 5. Student exits the program |
| **Test Data** | Since FactFun randomly outputs multiplication problems for practice, Team It’s an Algorithm cannot predict what the test data will be for the actual multiplication problem. However, when the student is prompted to choose whether or not to answer another question, on times 1-4 the student should enter y, Y, y, Y, and on time 5 they should answer n or N. |
| **Expected Results** | Student should be able to successfully run the program with no errors. |
| **Actual Results** |  |
| **Pass/Fail** |  |

**Test Case 2:**

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| **Test Scenario** | Student answers a few questions incorrectly while running the program. |
| **Test Case** | Student gets all problems correct but has to try 2 times on their second problem and 3 times on their third problem. |
| **PreConditions** | * Student accesses code via an online compiler (cpp.sh) * Student knows their multiplication facts or is provided with a calculator for testing purposes. |
| **Test Step(s)** | 1. Student runs the program using cpp.sh 2. Student accurately answers the first prompted math fact problem 3. Student answers ‘y’ or ‘Y’ when prompted to complete another problem 4. Student incorrectly answers the second problem. 5. Upon trying again, student correctly answers the second problem. 6. Repeat step 3 7. Students incorrectly answers the third problem. 8. Student tries a second time, unsuccessfully. 9. Upon trying a third time, student correctly answers the third problem. 10. Repeat step 3. 11. Student repeats steps 2 and 3. 12. Student repeats step 2, choosing no after solving the problem by entering ‘n’ or ‘N’ when prompted. 13. Student exits the program |
| **Test Data** | Since FactFun randomly outputs multiplication problems for practice, Team It’s an Algorithm cannot predict what the test data will be for the actual multiplication problem. However, when the student is prompted to choose whether or not to answer another question, on times 1-4 the student should enter y, Y, y, Y, and on time 5 they should answer n or N. |
| **Expected Results** | Student should be able to successfully run the program with no errors. |
| **Actual Results** |  |
| **Pass/Fail** |  |

**Test Case 3:**

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| **Test Scenario** | Student enters letters instead of numbers (ie. seven instead of 7). |
| **Test Case** | Student tries to enter the word form of the number instead of the standard form of the number. |
| **PreConditions** | * Student accesses code via an online compiler (cpp.sh) * Student knows their multiplication facts or is provided with a calculator for testing purposes. |
| **Test Step(s)** | 1. Student runs the program using cpp.sh 2. Student types the word form of the answer to their first prompted math fact. 3. Student follows the prompt to enter a number. 4. Student chooses not to solve any more problems by entering ‘N’. 5. Student exits the program. |
| **Test Data** | Since FactFun randomly outputs multiplication problems for practice, Team It’s an Algorithm cannot predict what the test data will be for the actual multiplication problem. However, when the student is prompted to choose whether or not to answer another question, they should answer N. |
| **Expected Results** | Student should be able to successfully run the program with no errors. |
| **Actual Results** |  |
| **Pass/Fail** |  |

**Test Case 4:**

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| **Test Scenario** | Student does not follow prompts. |
| **Test Case** | Student has no interest in playing and randomly presses letters and numbers on the keyboard. |
| **PreConditions** | * Student accesses code via an online compiler (cpp.sh) * Student knows their multiplication facts or is provided with a calculator for testing purposes. |
| **Test Step(s)** | 1. Student runs the program using cpp.sh 2. Student types randomly on the keyboard and presses enter. 3. Student repeats step 2 three more times. 4. Student accurately answers the math fact 5. Student randomly types again, ignoring the prompt. 6. Student reads the prompt and chooses not to answer any more questions by entering ‘n’. 7. Student exits the program. |
| **Test Data** | Since FactFun randomly outputs multiplication problems for practice, Team It’s an Algorithm cannot predict what the test data will be for the actual multiplication problem. However, when the student is prompted to choose whether or not to answer another question in step 6, they should answer N. |
| **Expected Results** | Student should be able to successfully run the program with no errors. |
| **Actual Results** |  |
| **Pass/Fail** |  |