TEST CASES

Any test that results a failure (F) will include a description of the event observed and will try to identify the cause, possibly a software bug. This failed event will be recorded in the Mantis Bug Tracker for evaluation and analysis for management of software development. The defect will be evaluated for severity and priority as described in the textbook on page 299, and as shown below. Resources will be allocated to fixing defects to reduce the highest risks in the most efficient and effective manner.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| HIGH RISK | | MODERATE RISK | | | LOW RISK | |
| CLASSIFICATION | **Priority – 1** | | **Priority – 2** | **Priority – 3** | | **Priority – 4** |
| **Severity – 1** | 1 – 1 | | 1 – 2 | 1 – 3 | | 1 – 4 |
| **Severity – 2** | 2 – 1 | | 2 – 2 | 2 – 3 | | 2 – 4 |
| **Severity – 3** | 3 – 1 | | 3 – 2 | 3 – 3 | | 3 – 4 |
| **Severity – 4** | 4 – 1 | | 4 – 2 | 4 – 3 | | 4 – 4 |
| Severity – 1 System crash, data loss, data corruption, security breach  Severity – 2 Operational error, wrong result, loss of functionality  Severity – 3 Minor problem, misspelling, UI layout, rare occurrence  Severity – 4 Suggestion | | | | | | |
| Priority – 1 Immediate fix, blocks further testing, very visible  Priority – 2 Must fix before the product is released  Priority – 3 Should fix when time permits  Priority – 4 Would like to fix but the product can be released as is | | | | | | |
| Testers:  MVF – Michael V. Fetick, Student #84270, Coleman University | | | | | | |

Defects found during test:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| HIGH RISK | | MODERATE RISK | | | LOW RISK | |
| CLASSIFICATION | **Priority – 1** | | **Priority – 2** | **Priority – 3** | | **Priority – 4** |
| **Severity – 1** | 24 | |  |  | |  |
| **Severity – 2** |  | | 29,30,31,32,33 | 12,14,19,21,28 | |  |
| **Severity – 3** |  | |  | 11 | |  |
| **Severity – 4** |  | | 34. | 3,7,10,17,18, 20,23,25,26,27 | | 1,2,4,5,6, 8,9,13,15,16, 22 |

A. The general appearance and behavior of the application.

1. General appearance of the application – Graphical User Interface (GUI)

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | The best solution is a GUI? | Customer choice | P | 2/20/2014 | MVF | (1) |
| b. | Subject matter and business rules are followed | Customer choice | F | 2/20/2014 | MVF | (2, 3) |
| c. | GUI Window colors consistent | Consistency | P | 2/20/2014 | MVF | Best |
| d. | GUI Window fonts consistent | Consistency | P | 2/20/2014 | MVF | Best |
| e. | GUI Window components have consistent size and spacing | Consistency | P | 2/20/2014 | MVF | Best |
| 1. 4-4 The GUI user-experience is good but the application would have to be downloaded by the user. A web-browser user-experience would be much easier to deploy. Suggest to the customer.  2. 4-4 The title of the bank is “Fred’s Federal Savings Bank.” Using a person’s first name for a business name is okay, e.g. Coleman University. But the variation of a possessive adjective like “Fred’s” may lack the presentation of “good faith” when customers are deciding where and to whom they will invest their money. Suggesting to change the name to “Freds Federal Savings Bank” or maybe to a name that describes the locality, i.e. “Kearny Mesa Federal Savings Bank” and then the title of this GUI panel.  3. 4-3 Terminology of “Years Customer” replaced with “Years Investing” may be better but this would need clarification of the rule. | | | | | | |

(Continued)

A. The general appearance and behavior of the application. (Continued)

2. General behavior of the application – Graphical User Interface (GUI)

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | Change states of the GUI Window frame | Consistent size | F | 2/20/2014 | MVF | (4) |
| b. | It auto-detects and resizes GUI Window frame for screen size | Effective size | F | 2/20/2014 | MVF | (5) |
| c. | GUI Window frame borders should not be resize-able | Consistent size | F | 2/20/2014 | MVF | (6) |
| d. | GUI components behaved as expected | Consistent Behavior | P | 2/20/2014 | MVF | (7, 8, 9, 10) |
| 4. 4-4 The GIU window frame should not be permitted to maximize, only to close or minimize.  5. 4-4 The application should auto-detect and resize the GIU window frame to the screen size of the hardware platform it’s running on, i.e. a 21” display monitor, a 15” notebook, 7” tablet, or a 5” phone.  6. 4-4 The GUI Window frame borders should not be resize-able.  7. 4-3 Invalid entries are not rejected immediately. All the fields will be required to be filled before pressing the “Compute Interest” button and for further testing of the verification of functions e.g. validating data types, error-handling of invalid data types, and analyzing computational results, that occurs at that time.  8. 4-4 An invalid entry results an error message and the field clears and has the focus for re-entry: Feature.  9. 4-4 Values are required to be entered for all fields, no defaults exist: Feature.  10. 4-3 Changes to any fields and pressing the Enter key has no effect. If it could result pressing the “Compute Interest” button then it would have a friendly, user interface: Feature | | | | | | |

B. User data-entry (**TEST-TO-PASS**)

1. User data-entry – (Decimal) the amount to invest

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | NUMERIC 500 – 49999 | Valid entries | P | 2/20/2014 | MVF | (11, 12) |
| b. | NO ROUNDING | No Rounding | P | 2/20/2014 | MVF | (13) |
| 11. 3-3 The $500 minimum deposit amount boundary is only expressed within a table in the requirements and is not explicitly specified anywhere else. I suspect the advertisement to the investor needs to have the message of the “$500 minimum deposit amount” specified very clearly.  12. 2-3 Amounts above $50,000 should be allowed, are we turning away business? The calculation of the top range should have no maximum limit.  13. 4-4 Decimal numbers entered, i.e. 1000.50, are accepted and they do not get rounded up or down. Amounts with portions of dollars can be handled, i.e. like the exact amounts transferred from other accounts; which is likely to occur frequently: Feature. | | | | | | |

2. User data-entry – (Integer) the term of the investment

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | NUMERIC 1 – 59 | Valid entries | P | 2/20/2014 | MVF | Good |
| b. | VALUES 60 – ~ | No upper bounds | F | 2/20/2014 | MVF | (14) |
| c. | NO ROUNDING NO ABSOLUTE VALUES | No Rounding | P | 2/20/2014 | MVF | (15) |
| 14. 2-3 Terms above 60 months should be allowed, are we turning away business? The calculation of the top range should have no maximum limit.  15. 4-4 Decimal numbers entered, i.e. 12.5, are accepted and they do not get rounded up or down. This function could handle date-ranges that would pass the argument with incremental months: Feature. | | | | | | |

3. User data-entry – (Integer) the age of the investor

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | NUMERIC 0 – ~ | No upper bounds | F | 2/20/2014 | MVF | (16) |
| b. | NO ROUNDING NO ABSOLUTE VALUES | No Rounding | P | 2/20/2014 | MVF | Good |
| 16. 4-4 The lower bound age limit of just months, or even a zero is okay. But there should be some obvious upper-bound limit that is reasonable for the age of the investor, e.g. 120 years. Currently it accepts erroneous entries, like 10,000 years plus. Except for range determination, this amount is not factored into the calculation. | | | | | | |

(Continued)

B. User data-entry (**TEST-TO-PASS**) (Continued)

4. User data-entry – (Boolean) is the investor a new customer?

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | BOOLEAN VALUE: YES | Entry Accepted | P | 2/20/2014 | MVF | (17) |
| b. | BOOLEAN VALUE: NO | Entry Accepted | P | 2/20/2014 | MVF | (18) |
| 17. 4-3 Entry of Yes automatically enforces the business rule #5 by auto-filling the next text field “Years Customer” with 0 (zero). Also, the text field “Years Customer” is disabled from being changed: Feature.  18. 4-3 Entry of No automatically advances the tab-stop to the next text field “Years Customer” for data entry: Feature. | | | | | | |

5. User data-entry – (Integer) the number of years the investor has been a customer

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | NUMERIC 0 – ~ | Less than Age | F | 2/20/2014 | MVF | (19) |
| b. | NO ROUNDING NO ABSOLUTE VALUES | No Rounding | P | 2/20/2014 | MVF | Good |
| 19. 2-3 The lower bound age limit of just months, or even a zero is okay. But there should be some obvious upper-bound limit that is reasonable and is less than the age of the investor. Currently it accepts erroneous entries, like 123,456 years. This amount is factored into the calculation. | | | | | | |

C. User data-entry (**TEST-TO-FAIL**)

1. User data-entry – (Decimal) the amount to invest

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | EMPTY (NO VALUE) | Entry Rejected | F | 2/20/2014 | MVF | (20) |
| b. | NEGATIVE VALUE | Entry Rejected | P | 2/20/2014 | MVF | Good |
| c. | NON-NUMERIC VALUE | Entry Rejected | F | 2/20/2014 | MVF | (21) |
| d. | COMMA-DENOMINATED | Comma Accepted | F | 2/20/2014 | MVF | (22) |
| e. | OUT-OF-RANGE (SMALL) | Reject below 500 | F | 2/20/2014 | MVF | (11) |
| f. | OUT-OF-RANGE (LARGE) | Reject above 49999 | F | 2/20/2014 | MVF | (12) |
| 20. 4-3 Pressing “Compute Interest” button with any Empty (No value entered) fields results an error message “A value must be entered.” If there is one empty field it gets the focus for data entry. Passed But if there are multiple empty fields, the error message does not specific which fields are empty.  21. 2-3 If non-numeric characters are added after a number, the entry is accepted and the calculation uses the number part of the entry.  22. 4-4 The comma “,” for comma-separated denominations should be acceptable: Feature | | | | | | |

2. User data-entry – (Integer) the term of the investment

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | EMPTY (NO VALUE) | Entry Rejected | F | 2/20/2014 | MVF | (20) |
| b. | NEGATIVE VALUE | Entry Rejected | P | 2/20/2014 | MVF | Good |
| c. | NON-NUMERIC VALUE | Entry Rejected | F | 2/20/2014 | MVF | (21) |
| d. | COMMA-DENOMINATED | Not Applicable | P | 2/20/2014 | MVF | Good |
| e. | OUT-OF-RANGE (SMALL) | Reject below 1 | F | 2/20/2014 | MVF | (11) |
| f. | OUT-OF-RANGE (LARGE) | Reject above 59 | F | 2/20/2014 | MVF | (14) |

(Continued)

C. User data-entry (**TEST-TO-FAIL**) (Continued)

3. User data-entry – (Integer) the age of the investor

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | EMPTY (NO VALUE) | Entry Rejected | F | 2/20/2014 | MVF | (20) |
| b. | NEGATIVE VALUE | Entry Rejected | F | 2/20/2014 | MVF | (23) |
| c. | NON-NUMERIC VALUE | Entry Rejected | F | 2/20/2014 | MVF | (24) |
| d. | COMMA-DENOMINATED | Not Applicable | P | 2/20/2014 | MVF | Good |
| e. | OUT-OF-RANGE (SMALL) | Reject below 1 | F | 2/20/2014 | MVF | (25) |
| f. | OUT-OF-RANGE (LARGE) | Reject above 59 | F | 2/20/2014 | MVF | (14) |
| 23. 4-3 Age of Investor (Entry of negative amounts, e.g. -5 years) should not be permitted.  24. 1.1 System crash. Error message: “Run-time error. Type Mismatch”  25. 4-3 Age of Investor (Entry of extremely low amounts, e.g. 0.00001 years) should not be permitted. | | | | | | |

4. User data-entry – (Boolean) is the investor a new customer?

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | BOOLEAN VALUE: NOT YES/NO | Reject Entry | F | 2/20/2014 | MVF | (26) |
| 26. 4-3 Any single-key entry that is not (y, n, Y or N) is accepted and defaults to NO. Then puts the focus on the next tab-stop “Years Customer” for entry. This entry should not be permitted. | | | | | | |

5. User data-entry – (Integer) the number of years the investor has been a customer

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | EMPTY (NO VALUE) | Entry Rejected | F | 2/20/2014 | MVF | (20) |
| b. | NEGATIVE VALUE | Entry Rejected | F | 2/20/2014 | MVF | (23) |
| c. | NON-NUMERIC VALUE | Entry Rejected | F | 2/20/2014 | MVF | (24) |
| d. | COMMA-DENOMINATED | Not Applicable | P | 2/20/2014 | MVF | Good |
| e. | OUT-OF-RANGE (SMALL) | Reject below 1 | F | 2/20/2014 | MVF | (27) |
| f. | OUT-OF-RANGE (LARGE) | Reject above 59 | F | 2/20/2014 | MVF | (19, 28) |
| 27. 4-3 Years Customer (Entry of extremely low amounts, e.g. 0.00001 years are permitted)  28. 2-3 Years Customer (Entry of extremely high amounts, e.g.123456 years are permitted) results incorrect calculation of interest rate: 1238.56%. This value should be less than the “Age of Investor,” also see item (19) above. | | | | | | |

D. Computation – (**TEST-TO-PASS**) then conduct (**TEST-TO-FAIL**)

1. (**TEST-TO-PASS**) CRITERIA: (Check values above and below each boundary of the ranges)

Base interest rate (rule 1)

1. User data-entry – (Decimal) the amount to invest (AMOUNT-RANGE ROWS)

2. User data-entry – (Integer) the term of the investment (TERM-RANGE COLUMNS)

3. User data-entry – (Integer) the age of the investor UNDER 61 YRS AGE

4. User data-entry – (Boolean) is the investor a new customer? NO

5. User data-entry – (Integer) the number of years the investor has been a customer: < 3 YRS

RESULT: Refer to requirements table for correct logic of Computation (DETERMINE PASS/FAIL)

Senior-Citizen interest rate (rule 2) (**TEST-TO-PASS**)

1. User data-entry – (Decimal) the amount to invest: Over 17000 OR Rule 2.

2. User data-entry – (Integer) the term of the investment: 40 MONTHS OR MORE OR Rule 1.

3. User data-entry – (Integer) the age of the investor: 62 YRS OR MORE

4. User data-entry – (Boolean) is the investor a new customer? NO then YES

5. User data-entry – (Integer) the number of years the investor has been a customer: (0 – ~)

RESULT: Calculate the base rates PLUS 0.10% (Senior-Citizen interest rate)

Ancestry interest rate (rule 3) (**TEST-TO-PASS**)

1. User data-entry – (Decimal) the amount to invest: Over 14999 AND Rule 2.

2. User data-entry – (Integer) the term of the: 7 MONTHS OR MORE AND Rule 1.

3. User data-entry – (Integer) the age of the: 78 YRS OR MORE

4. User data-entry – (Boolean) is the investor a new customer? NO then YES

5. User data-entry – (Integer) the number of years the investor has been a customer: (0 – ~)

RESULT: Calculate the base rates PLUS 0.10% (Senior-Citizen interest rate)  
 PLUS 0.15% (Ancestry interest rate)

2. MUTUALLY EXCLUSIVE (**TEST-TO-PASS**):

NEW CUSTOMER interest rate (rule 4) (**TEST-TO-PASS**)

4. User data-entry – (Boolean) is the investor a new customer? YES

5. User data-entry – (Integer) the number of years the investor has been a customer < 3 YRS

GOOD CUSTOMER interest rate (rule 5) (**TEST-TO-PASS**)

4. User data-entry – (Boolean) is the investor a new customer? NO

5. User data-entry – (Integer) the number of years the investor has been a customer >= 3 YRS

(Continued)

D. Computation – (**TEST-TO-PASS**) then conduct (**TEST-TO-FAIL**) (Continued)

3. MUTUALLY EXCLUSIVE (**TEST-TO-FAIL**): Verify FAIL of the following cases –

NEW CUSTOMER interest rate (rule 4) (**TEST-TO-FAIL**)

4. User data-entry – (Boolean) is the investor a new customer? NO

5. User data-entry – (Integer) the number of years the investor has been a customer   
 3 OR MORE YRS

GOOD CUSTOMER interest rate (rule 5) (**TEST-TO-FAIL**)

4. User data-entry – (Boolean) is the investor a new customer? YES

5. User data-entry – (Integer) the number of years the investor has been a customer   
 UNDER 3 YRS

4. CRITERIA: Check values above and below each boundary of the ranges

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 1 – 11 [7] | 12 – 35 | 36 – 59 [40] | 60 – ~ | NEW CUST (YES) | NEW CUST (NO) |
| 0 – 499 | P (5) | | | | | |
| 500 – 14999 | P | P | (29, 30) | F  (13) | P | P |
| 17000 | P | P | (31-32) | P | P |
| 14999 | P | P | (29, 30) | P | P |
| 15000 – 49999 | P | P | (29, 30) | P | P |
| 50000 – ~ | F (11) | | | | | |
| 0 – 61 YRS AGE | P | P | P | F  (13) | P | P |
| 62 – 77 YRS AGE | P (33) | P | P (33) | P | P |
| 78 – ~ YRS AGE | P | P | (30) | P | P |
| GOOD CUST (NO) | P | P | P | p | P (Mutually Exclusive) |
| GOOD CUST (YES) | P | P | P | P (Mutually Exclusive) | P |

(Continued)

D. Computation – (**TEST-TO-PASS**) then conduct (**TEST-TO-FAIL**) (Continued)

5. EVALUATE TEST RESULTS:

Refer to requirements table for correct logic of Computation (DETERMINE PASS/FAIL)

| TC | Test Execution Steps | Expected Result | Test Result | Date Tested | Tester | Comment |
| --- | --- | --- | --- | --- | --- | --- |
| a. | CALC VALUES (EACH CELL) | Correct Logic | F | 2/21/2014 | MVF | (34) |
| b. | CALC VALUES (EACH ROW) | Correct Logic | F | 2/21/2014 | MVF | (29 to 33) |
| c. | CALC VALUES (EACH COLUMN) | Correct Logic | F | 2/21/2014 | MVF | (29 to 33) |
| d. | VARIANT – AGE | Correct Logic | F | 2/21/2014 | MVF | (29 to 33) |
| e. | VARIANT – NEW CUSTOMER | Correct Logic | P | 2/21/2014 | MVF | Good |
| f. | VARIANT – GOOD CUSTOMER | Correct Logic | P | 2/21/2014 | MVF | Good |
| 29. 2-2 Terms (Entry of 40 or more) results an incorrectly determined interest rate of 4.3%  for the range of 36-59 months. This also occurs with any deposit amounts. This also occurs with any age amounts. The error is typically a 0.01 increase.  30. 2-2 Terms (Entry of 40 or more) AND Age (Entry of 78 or less) results an incorrectly determined interest rate of 4.5% because it lacks the addition of the Ancestry 0.15 rate (at age 78). It correctly includes the Senior-Citizen 0.10 rate (at age 62).  31. 2-2 ((Terms below 40) BUT (Amount above 17000)) AND Age (Entry above 78) results an incorrectly determined interest rate of 4.55% because it incorrectly includes the addition of the Ancestry 0.15 rate (at age 78), and it incorrectly excludes the Senior-Citizen 0.10 rate (at age 62).  Proof of FAIL, see item (32) for proof of PASS.  32. 2-2 ((Amount below 17000) BUT (Terms above 40)) AND Age (Entry above 78) results a correctly determined interest rate of 4.65% because it correctly includes the addition of the Ancestry 0.15 rate (at age 78), and the Senior-Citizen 0.10 rate (at age 62).  Proof of PASS, see item (31) for proof of FAIL.  33. 2-2 The requirements may have a flaw in the logic unless it is an intended feature.   Rule 3 says, “… over $14,999 and 7 months … so #2 applies to him”   but rule 2 says, “… over $17,000 or 40 months …”  Therefore, any amount between $15,000 through $16,999 and when the term is between 7 to 39 months,  then it results no addition of the Senior-Citizen 0.10 Rate. And the application behaves correctly to this logic.  34. 4-2 The Compute Interest button results a message with the correct computed result but as a suggestion, it would be more clear if it showed a breakdown of the composite interest rates. This is essential to evaluating the adherence to the business rules: feature. | | | | | | |

THE END.