**Finished test plan:**

**Unit tests:**

**Get\_userdetails:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| Get\_userdetails | Valid password input | Password = clyderunners | Valid – call display\_menu | As expected |  |
| Get\_userdetails | Invalid password input | Password = glasgow123 | Invalid - Password incorrect – “number” attempts remining | As expected |  |
| Get\_userdetails | No pasword input | Password= null | Invalid - Password incorrect – “number” attempts remining | As expected |  |

**Get\_Choice**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| Get\_choice | Valid input | 1 | You have selected choice 1 “choice name” | As expected |  |
| Get\_choice | Valid input | 7 | You have selected choice 7 “choice name” | As expected |  |
| Get\_choice | Invalid input | 0 | Display menu. To make a selection type, type a number from 1 to 7 | As expected |  |
| Get\_choice | Invalid input | 8 | Display menu. To make a selection type, type a number from 1 to 7 | As Expected |  |
| Get\_choice | Invalid input | Null imput | Display menu. To make a selection type, type a number from 1 to 7 | error | Researched how to resolve but outside the scope of trail program |

**Act\_On\_Choice**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| Act\_on\_choice | Validate switch statement | Case 1 | 1. Read and display file | As expected |  |
| Act\_on\_choice | Validate switch statement | Case 2 | 2. Sort and print recorded times | As expected |  |
| Act\_on\_choice | Validate switch statement | Case 3 | 3. find and print the fastest time | As expected |  |
| Act\_on\_choice | Validate switch statement | Case 4 | 4. find and print the slowest time | As expected |  |
| Act\_on\_choice | Validate switch statement | Case 5 | 5. search | As expected |  |
| Act\_on\_choice | Validate switch statement | Case 6 | 6. time occurrences | As expected |  |
| Act\_on\_choice | Validate switch statement | Case 7 | 7. exit program | As expected |  |

**ReadFromFile:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| ReadFromFile | Valid reading | Race results.text = John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | Print - John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | As expected |  |
| ReadFromFile | Valid reading | No file passed | Empty array | As expected |  |
|  |  |  |  |  |  |

**Print\_array**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| Print\_array | Valid reading | Race results.text = John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | As expected |  |
| Print\_array | Valid reading | No file passed | Empty array | As expected |  |

**Sort\_Array**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| Sort\_Array | Valid sort | Unsorted array = 70, 90, 75, 70, 95, 103, 80, 110, 68, 120, 80, 140, 90, 72, 78 97 | 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | As expected |  |
| Sort\_Array | Valid sort | Sorted array = 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | As expected |  |
| Sort\_Array | Valid sort | Empty array | Empty array | As expected |  |

**WriteToFile**:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| WriteToFile | Valid write | Unsorted array = 70, 90, 75, 70, 95, 103, 80, 110, 68, 120, 80, 140, 90, 72, 78 97 | Unsorted array = 70, 90, 75, 70, 95, 103, 80, 110, 68, 120, 80, 140, 90, 72, 78 97 | As expected |  |
| WriteToFile | Valid write | Sorted array = 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | As expected |  |
| WriteToFile | Valid write | Empty array | Empty array | As expected |  |

**Find\_Min**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| Find\_Min | Valid minimum | Unsorted array = 70, 90, 75, 70, 95, 103, 80, 110, 68, 120, 80, 140, 90, 72, 78 97 | 68 | 70 | Code was wrong, when copying over code, was(int i = 1; i <= 6; i++) change 6 to the length of the array.  Now showing as for (int i = 1; i <= 15; i++).  Results correctly showing as 68. |
| Find\_Min | Valid minimum | Sorted array = 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | 68 | As expected |  |
| Find\_Min | No array passed | Empty array | Empty array | As expected |  |

**Find\_Max**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| Find\_Max | Valid maximum | Unsorted array = 70, 90, 75, 70, 95, 103, 80, 110, 68, 120, 80, 140, 90, 72, 78 97 | 140 | As expected |  |
| Find\_Max | Valid maximum | Sorted array = 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | 140 | As expected |  |
| Find\_Max | No array passed | Empty array | Empty array | As expected |  |

**Search:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| search | Valid search | User input = 140  Sorted array = 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | 15 | -1 | Asking for user input twice and then giving the wrong position in the array. Changed the code in the act\_on\_choice module to store the resulting value from SearchArray and print the value.   int result = SearchArray(sortedarray); Console.WriteLine($"The position of the number is: {result}")  Changing the Searcharray algorithm to i < sortedArray.Length; i++) resolved the issue and now returns result as expected. |
| search | Valid search | Userinput = 120  Sorted array = 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | Position 14 | As expected |  |
| search | No array passed | Empty array | Empty array | As expected |  |

**Search Trace Table:**

**Algorithm:**

Search

1. print enter the time in seconds
2. get user input
3. loop for length of array
   1. if time specified matches value of element in array
      1. set element position to a variable
4. return value of the variable

|  |  |  |  |
| --- | --- | --- | --- |
| **Found** | **Time to be found** | **Array position** | **Item in array position** |
| **False** | **140** | **0** | **68** |
| **False** | **140** | **1** | **70** |
| **False** | **140** | **2** | **70** |
| **False** | **140** | **3** | **72** |
| **False** | **140** | **4** | **75** |
| **False** | **140** | **5** | **78** |
| **False** | **140** | **6** | **80** |
| **False** | **140** | **7** | **80** |
| **False** | **140** | **8** | **90** |
| **False** | **140** | **9** | **90** |
| **False** | **140** | **10** | **95** |
| **False** | **140** | **11** | **97** |
| **False** | **140** | **12** | **103** |
| **False** | **140** | **13** | **110** |
| **False** | **140** | **14** | **120** |
| **True** | **140** | **15** | **140** |

**A screenshot of a computer

Description automatically generated**

**CountOccurrences:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| CountOccurrences | Valid CountOccurrences | Userinput = 140  Unsorted array = 70, 90, 75, 70, 95, 103, 80, 110, 68, 120, 80, 140, 90, 72, 78 97 | 140 | 1 times | Finding the userinput was getting asked twice. Made same mistake as before and changed the act\_on\_choice to  int count = countOccurrences(racetimes); Console.WriteLine($"The number has occurred: {count} times ");  resolved the issue and getting expected results. |
| CountOccurrences | Valid CountOccurrences | Sorted array = 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | 140 | 1 times |  |
| CountOccurrences | No array passed | Empty array | Empty array | As expected |  |

**Integration test**:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| Password code and choice menu | Valid password | Password = clyderunners | Displays welcome message and choice menu | As expected |  |
| Password code and choice menu | Invalid password | Password = glasgow123 | Username or password incorrect – “number” attempts remining | As expected |  |
| Password code and choice menu | No input | Password= “ ” | Username or password incorrect – “number” attempts remining | Error – as expected | Outside of scope of project and trial program |

**System test:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Unit name | Reason | Test data | Expected result | Result | Comments |
| Read and display | Full system test | Password=clyderunners  Choice 1  Race results.text = John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | Output as expected but found looping issue | After changing location of where I was calling get\_choice and Act\_on\_choice to inside of the print\_message loop, user wasn’t receiving prompt for input. Removed while loop in the get\_choice method and that resolved the issue. |
| Sort and print recorded times | Full system test | Password=clyderunners  Choice 2  Race results.text = John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | 68, 70, 70, 72, 75, 78, 80, 80, 90, 90, 95, 97, 103, 110, 120, 140 | As expected |  |
| Find and print fastest time | Full system test | Password=clyderunners  Choice 3  Race results.text = John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | 68 | 70 – not the fastest time |  |
| Find and print the slowest time | Full system test | Password=clyderunners  Choice 4  Race results.text = John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | 140 | As expected |  |
| search | Full system test | Password=clyderunners  Choice 5  User input = 68  Race results.text = John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | Chantelle Oliver 68 | As expected |  |
| Count occurrences | Full system test | Password=clyderunners  Choice 6  User input = 80  Race results.text = John Brown 70  Peter Black 90  Anne Waters 75  William White 70  Betty Davis 95  Colin Davis 103  Natalie Wallis 80  Paul Blue 110  Chantelle Oliver 68  Gavin Brown 120  Elliot Ness 80  Al Capone 140  Richard Smith 90  Callum Dawson 72  Adam Stark 78  Pauline Cook 97 | 80 appears 2 times | As expected |  |
| Exit program | Full system test | Password=clyderunners  Choice 7 | \*Program closes\* | As expected |  |