PROGRAMMING FUNDAMENTALS

Coursework 2

[CHLOE ROWE]

27025481

Coursework 2

Section A: Algorithm Complexity Analysis

Algorithm A

|  |  |
| --- | --- |
| Input | ~~data = 2-list consists of student names and marks of size n~~ |
| 1 | counter = 1 **(1)** |
| 2 | For i = 0 to n – 1 **(n)** |
| 3 | print(“Record number “, counter) **1 x (n)** |
| 4 | for j = 0 to (length of i) – 1 **(i x (n))** |
| 5 | print(data[i][j]) **1 x (i x (n))** |
| 6 | counter = counter + 1 **(3)** |
| 7 | print() |
| Output | ~~List of records printed on the console~~ |

Algorithm B

|  |  |
| --- | --- |
| Input | ~~data = 2-list consists of student names and marks of size n~~ |
| 1 | counter = 1 **(1)** |
| 2 | for i = 0 to n – 1 **(n)** |
| 3 | print(“Record number “, counter) **1 x (n)** |
| 4 | print(data[i][0]) **1 x (n)** |
| 5 | print(data[i][1]) **1 x (n)** |
| 6 | counter = counter + 1 **(3)** |
| Output | ~~List of records printed on the console~~ |

Algorithm B has less complexity than Algorithm A.

Algorithm A has a for loop nested inside another for loop which means that for that algorithm as *n* grows exponentially, so too will *i.* This is compared with Algorithm B that is more linear since it only has 1 for loop and the print statements will require the same number of operations and run time for each pass of the loop.

Section E: Unit Testing

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Test ID | Case | User Input | Expected Result | Result | Remarks | Extra |
| #01 | Password < 5 chars | “abcd” | Console\_Output:  Password must be at least 5 characters long! | A screenshot of a computer  Description automatically generated with medium confidence | PASS |  |
| Password is a space | “ ” | Console\_Output:  Password must be at least 5 characters long! | A screenshot of a computer  Description automatically generated with medium confidence | PASS |  |
| Password isn’t entered | “<ENTER\_KEY>” | Console\_Output:  Password must be at least 5 characters long! | A screenshot of a computer  Description automatically generated with medium confidence | PASS |  |
| Password == 5 chars | “abcde” | Program moves on to display username and encrypted password | Text  Description automatically generated | PASS | This case highlights that a password of length(5) will not be encrypted using a rail-fence cipher length of 5: A longer password should be enforced |
| Password > 5 chars | “password” | Program moves on to display username and encrypted password | Text  Description automatically generated | PASS |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A |  |  |  |  |
|  | B |  |  |  |
|  |  | C |  |  |
|  |  |  | D |  |
|  |  |  |  | E |