## CS Topic 4 (Assessment 2)

## Computational thinking, problem-solving and programming

19th April 2013 Mr Trofimczuk

**Instructions:**

* Time provided for test: 1hr
* Total marks is 52 Marks
* Test results will be calculated into a percentage and worked out into a grade between 1-7 (see grade boundaries below) and published on Wilma after feedback with class. Results will also be sent to each student email address.
* **All electronic devices must be turned off**
* Answer all questions on the paper provided and ensure you have wrote your full name on each piece of paper-Remember to write an email address on answer paper.

**Test Questions:**

**Answer True or False for the following questions:**

1. An insertion sort puts one more item into its place with respect to the already sorted portion?
2. Recursion is another name for iteration?
3. Recursive algorithms use IF statements?
4. An insertion sort puts one or more item into its place with respect to the already sorted portion?
5. Quicksort is not always quick?

*(5 marks)*

6)

*(6 marks)*

Length 11

List

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | 41 | 66 | 20 | 2 | 90 | 9 | 34 | 19 | 40 | 99 |

[ 0 ] [ 0 ] [ 0 ] [ 0 ] [ 0 [ 0 ] [ 0 ] [ 0 ] [ 0 ] [ 0 ] [ 0 ]

1. Show the state of the list when firstUnsorted is first set to equal to the fourth item in the selection sort.
2. Show the state of the list when first recursive call is made in Quicksort using list [ 0 ] as the split value.

7)

a) Set sum to 0

Read num1

Set sum to sum + num1

Read num2

b) Set sum to sum + num2

Read num3

Set sum to sum + num3

c) IF (sum < 0)

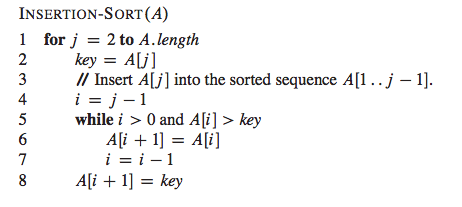
Write ‘E’

d) ELSE

Write sum

1. What is the output if the total is negative? *(2 marks)*
2. What is the output if the values for num1=3, num2=1, num3=2? *(2 marks)*
3. Explain the process for lines a, b, c and d *(4 marks)*

8)



1. Explain how the above algorithm works line by line if A = (4, 1, 3, 5, 1, 3)

(8 marks)

9) Here is an algorithm for reading and summing positive values until 10 have been counted. posCount counts the number of positive values as they get read. Explain line by line what is happening from line a*. (7 marks)*

a) Set sum to 0

b) Set posCount to 0

c) WHILE (posCount <10)

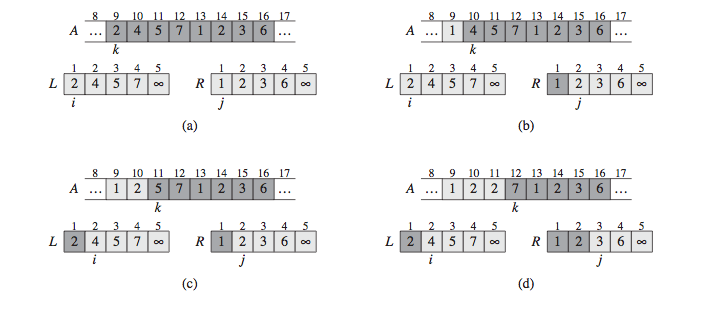
d) Read a value

e) IF (value > 0)

f) Set posCount to posCount + 1

g) Set sum to sum + value

10)



Explain what is happening in the following merge sort algorithm for: *(8 marks)*

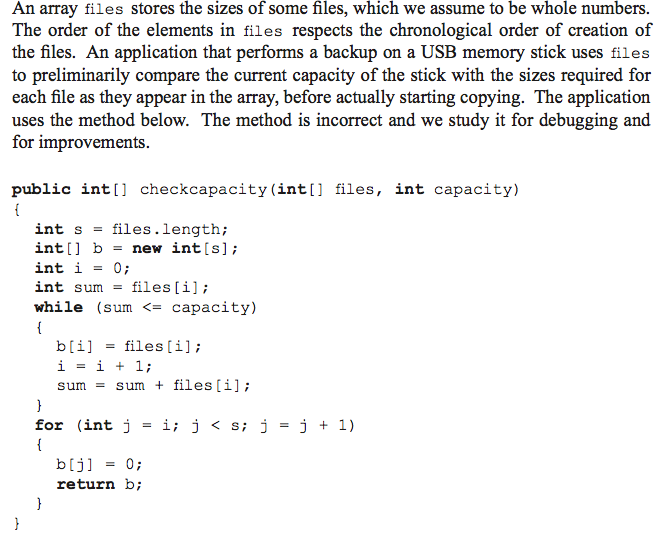
a)

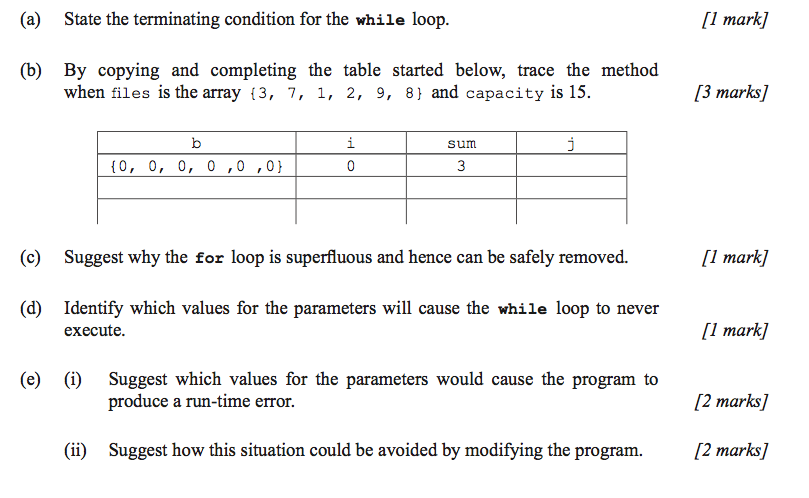
b)

c)

d)

11)





*(10 marks)*

|  |  |
| --- | --- |
| **Grade** | **Raw Score Estimates** |
| 1 | 1-12 |
| 2 | 13-17 |
| 3 | 18-22 |
| 4 | 23-28 |
| 5 | 29-34 |
| 6 | 35-40 |
| 7 | 42+ |

**Mr Trofimczuk’s Grade Boundaries for Computer Science (updated January 2013)**

Grade Percentage

1 0-25%

2 26-36%

3 37-47%

4 48-58%

5 59-69%

6 70-79%

7 80%-100%