University of Cape Town
Department of Computer Science

Computer Science CSC1010H

Class Test 3
Wednesday, 1 October 2014

Marks: 35

Time: 40 minutes

- Approximate marks per question are shown in brackets
- The use of calculators is permitted

	Surname		Initials
NAME:			

STUDENT NO: | | **COURSE CODE:** | CSC

This paper consists of 5 questions and 5 pages (including this cover page).

Mark Allocation							
Question	**Marks**	**Internal**	**External**	**Question**	**Marks**	**Internal**	**External**
1	3			5	5		
2	12						
3	5						
4	10						
Total				**Total**			
			Grand Total				
			Final Mark				
Internal Examiner:			**External Examiner:**				

Question 1. **[3 marks]**

a) Which Python keyword is used to specify a code block which should be executed in an exception, whether an exception occurs or not. [1]

> finally

b) Which Python exception is generated when trying to index a sequence out of range. [1]

> IndexError

c) Write a line of code which goes at the top of the code block which handles the exception mentioned in b) and putting that exception in a variable *ie*. [1]

> except IndexError as ie

Question 2. **[12 marks]**

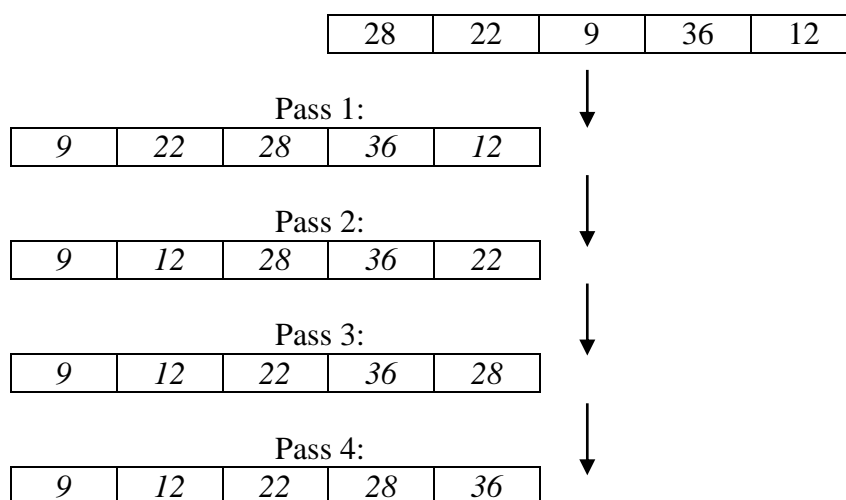a) Considering the sorting algorithms Selection Sort and Merge Sort:
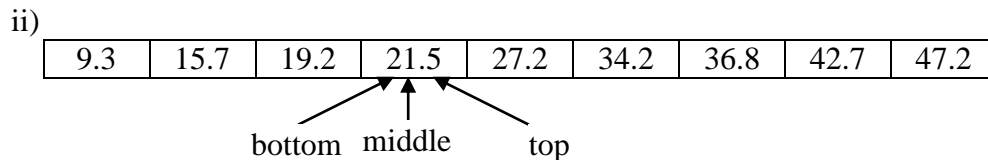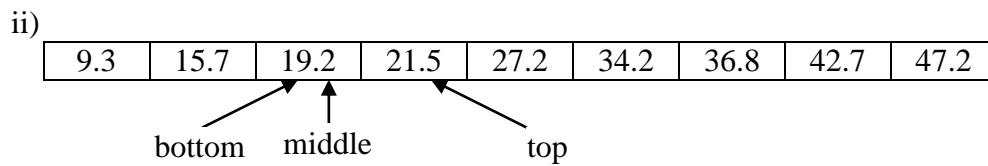
i. Which algorithm is more efficient? [1]

> Merge

ii. Which is algorithm is simpler to code? [1]

> Selection

b) Show how the following array changes after each pass of an ascending-order selection sort. [4]

28	22	9	36	12

Pass 1:

9	22	28	36	12

Pass 2:

9	12	28	36	22

Pass 3:

9	12	22	36	28

Pass 4:

| 9	12	22	28	36

c) Use Binary Search to find the value 21.5 in the following sorted array. Show how the indices *bottom*, *middle* and *top* will change for each step of the Binary Search (do this by drawing the arrows with labels, as shown above). [6]

9.3	15.7	19.2	21.5	27.2	34.2	36.8	42.7	47.2

bottom   middle   top

i)

9.3	15.7	19.2	21.5	27.2	34.2	36.8	42.7	47.2

bottom   middle   top

ii)

9.3	15.7	19.2	21.5	27.2	34.2	36.8	42.7	47.2

bottom middle   top

ii)

9.3	15.7	19.2	21.5	27.2	34.2	36.8	42.7	47.2

bottom middle   top
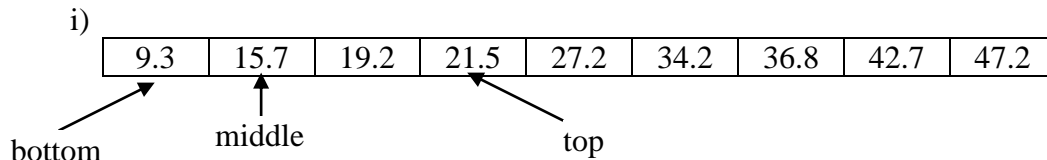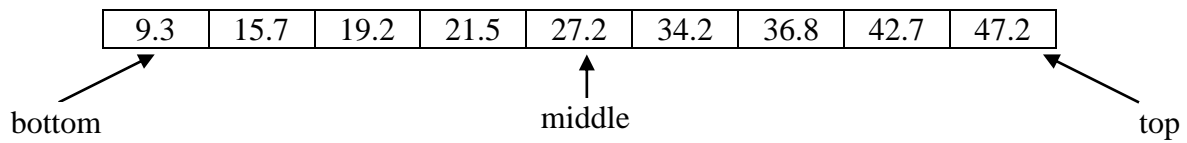
Question 3.   **[5 marks]**

a) Fill in the two missing elements from the process used for the Scientific Method.   [2]

Observe → *Hypothesize OR Theorize* → Experiment → *Analyse* → Conclude/Report
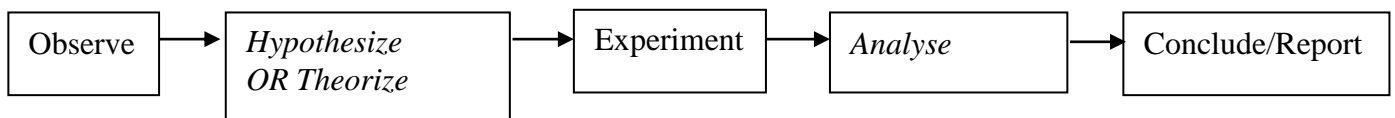
b) Name two ways to present data from an experiment in an organized and visual way.   [2]

        Table

        Graph

c) What is the Python Epoch reference date?   [1]

        1 January 1970

Question 4.   **[10 marks]**

a) Create a class called Triangle which has object variables for sides a, b and c. The Triangle class should have a constructor and a string conversion method. It should also have a method which returns the perimeter of the triangle.   [7]

```
class Triangle: #1

    def __init__(self,a,b,c): #1
        self.side_a = a
        self.side_b = b    #1 for all assignments
        self.side_c = c

    def __str__(self):  #1
        return str(self.side_a) + "," + str(self.side_b) + "," + str(self.side_c) #1

    def perimeter(self): #1
        return self.side_a + self.side_b + self.side_c #1
```

b) Using the class defined above, write a short code fragment which creates a triangle object with sides 3, 4 and 5, prints out the object perimeter and prints out the object itself.   [3]

```
tri = Triangle(3,4,5) #1
print(tri.perimeter()) #1
print(tri) #1
```

Question 5.   **[5 marks]**

a) Consider the following written question, and do a <u>task analysis</u> on the question.

Considering Python loops, contrast for loops and while loops, specifically looking at keywords and their use, i.e. when to use which loop.   [3]

Broad topic: Loops #1

Specific details: for loops, while loops, keywords, use #1

Question/Instruction word: contrast #1

b) In the formal writing process, indicate why referencing is important?   [1]

−To acknowledge the work of others
−To share resources
−To place authors in a field of knowledge
−To show where we got our information from so that it can be verified
−To support our claims with evidence

(any one)

Indicate if the following statements are true or false:

c) In academic writing, personal pronouns like "I", "me" and "we" are frequently used. [1]

          False