NAME : Thomas Bates

CLASS : 9E

DATE : 2/7/2020

Computer Science - Fundamentals of Algorithms

30 Questions

1. An Insertion Sort was used for older computers - it is not relevant anymore

a) True

b) False ✓

2.

What's missing from this part of a flowchart?

a) A Line

b) An Arrow ✓

c) A Diamond

d) A Square

3.

Which type of sort algorithm is this?

a) Merge

b) Insertion
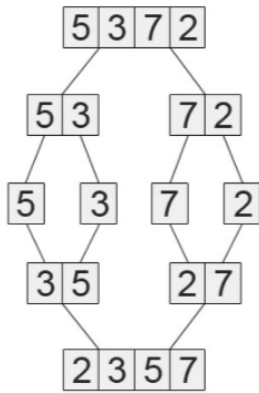
c) Bubble ✓

4.

Which type of sort algorithm is this?

a) Merge ✓

b) Bubble

c) Insertion

5.   What is pseudocode?

a) Simplified programming language, that is not a specific language ✓

b) Complicated programming language

c) Simple programming language, which is linked to a specific language

d) A type of cheese

6.   If you have a large amount of data to search through the best algorithm would be a

a) Binary Search ✓

b) Linear Search

7.

What does this shape represent?

a) Start/End

b) Input/Output
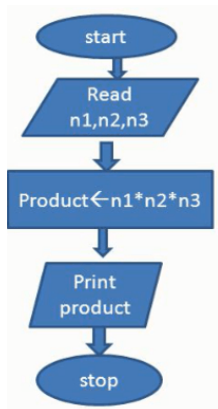
c) Decission ✓

d) Process

8.

What does this shape represent?

a) Process ✓

b) Input/Output

c) Decision

d) Start/End

9.

Assume n1 = 10 ... n2 = 2 ... n3 = 2
What will be displayed as output?

a) 30

b) 10

c) 20

d) 40 ✓

10. What is a flowchart?

a) A graphical representation of algorithms. ✓

b) A program code written in Logo.

c) A textual representation of algorithms.

d) A cluster of different shapes.

11. Which of these is NOT a search algorithm

a) Linear

b) Bubble ✓

c) Binary

12. What is the correct definition of an algorithm?

a) An algorithm is a process of baking bread.

b) An algorithm is a step by step instructions to solve a problem. ✓

c) An algorithm is the process of breaking problems.

d) An algorithm is a software used to compute numbers.

13. Computers can solve any problem that can be computationally solved.

a) TRUE ✓

b) FALSE

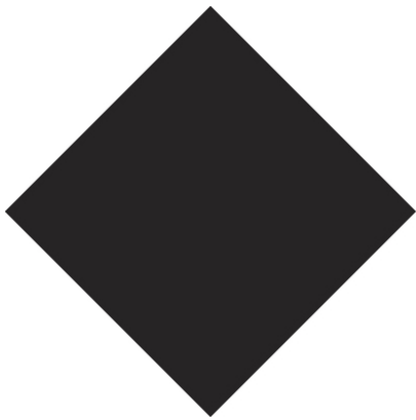14. What is the correct symbol for an input in a flowchart?

a) A square

b) A rectangle

c) A parallelogram ✓

d) A diamon

15.

What does this shape represent in flowchart?

a) Decision ✓

b) Start/Stop

c) Process

d) Input/Output

16.

Which type of search algorithm is this?

a) Binary ✓

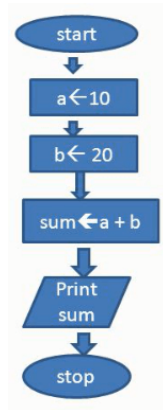b) Linear

17.

What does this shape represent?

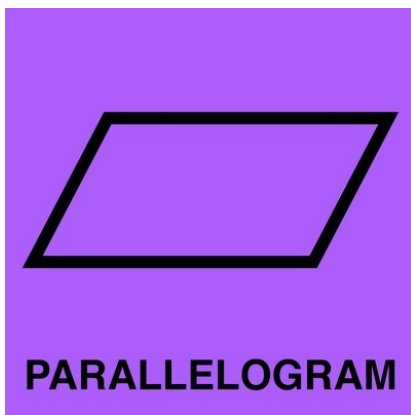a) Decision

b) Start/Stop

c) Input/Output✓

d) Process

18.

What will be displayed as output?

a) 30 ✓

b) 20

c) 10

d) 40

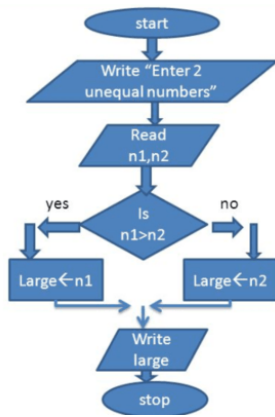19. Which search algorithm is the easiest to understand?

a) Binary

b) Linear ✓

20.

PARALLELOGRAM

What does this shape represent in flowchart?

a) Start/Stop

b) Process

c) Input/Output ✓

d) Decision

21.

Assume n1 = 10 ... n2 = 20
What will be displayed as output?

a) 10

b) 20✓

22. What links each instruction in a flowchart?

a) A double line

b) An arrow✓

c) A double arrow

d) A line

23. A merge sort requires both lists of data to be in the correct order

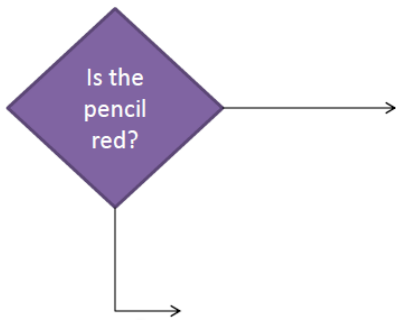a) False✓

b) True

24. Abstraction is.....

a) The process of removing unnecessary details from a problem. ✓

b) The process of assigning values to variables.

c) The process of breaking down problems.

d) The process of drawing abstract pictures.

25.

What's missing ?

a) On/Off

b) Hello/Goodbye

c) Yes/No ✓

d) Pink/Blue

26.

Assume n1 = 6 ... n2 = 4 ... n3 = 2
What will be displayed as output?

a) 5

b) 4 ✓

c) 6

d) 3

27. Decomposition is a term used to define...

a) The process of coding a problem.

b) The process of breaking down problems into smaller problems. ✓

c) The process of taking out unnecessary details from problems.

d) The process of assigning value to a variable.

28. The process carried out in computer systems is represented by _____ in flowchart.

a) Diamond

b) Square ✓

c) parallelogram

d) Rectangle

29. If the data is in order the best search to use would be a

a) Binary Search ✓

b) Linear Search

30. Which of these is NOT a Sort algorithm

a) Merge

b) Binary ✓

c) Insertion

d) Bubble

Sorting and Searching Algorithms Practice Questions

Merge Sort

A list is made up of the numbers 84, 52, 4, 6, 68, 39, 53, 1.
Show the steps involved when sorting this list of numbers using a merge sort algorithm.

Split the list in half into 84, 52, 4, 6 and 68, 39, 53, 1. Then split the first half into 84, 52 and

4, 6. Then sort both of the two small lists of two numbers and merge together to get a sorted

list of 4, 6, 52, 84. The same process is then repeated for the second half to finally get 1, 39,

53 and 68. You then finally merge the two lists into one list to get the sorted list of 1, 4, 6, 39

52, 53, 68, 84.

Bubble Sort

A list is made up of the numbers 84, 52, 4, 6, 68, 39, 53, 1.
Show the steps involved when sorting this list of numbers using a bubble sort algorithm.

Take the first two numbers and sort them from small to big to get 52 and 84. Then drop the

smaller number, 52, and pick the next number, 4, then sort again. This is then repeated

until the end of the list. 84, the biggest number, will be pushed to the back. You then go

back to the beginning of the list and repeat the sort, skipping the last number because that

has already been oushed to the back. Repeat skipping the last two numbers and for every

line, you skip another number until you go through with no swaps made which means that

the list has been sorted.

(3)

Linear Search

Below is an algorithm for a linear search

```
PROCEDURE search(list,INPUT)
     size = len(list)
     For i from 0 to size-1 DO
     If list[i] = INPUT
          OUTPUT Found item
list = Jim, Fred, Sue, Sheila
INPUT Enter item to search for
search(list,INPUT)
```

Rewrite the algorithm so it will output a message if an item has not been found.

```
PROCEDURE search(list,INPUT)
    size = len(list)
    FOR i FROM 0 TO size-1 DO
        IF list[i] = INPUT
            OUTPUT Found item
    OUTPUT Could not find item

list = Jim, Fred, Sue, Sheila
INPUT = Enter item to search for
search(list, INPUT)
```

Binary Search

Staff use a stock control system to check stock availability. The system uses a binary search algorithm. Here is an ordered list of shoe codes. The target value is 2. Give the sequence of values visited to find the target value using a binary search.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

1 2 3 4 5 6 7 8

1 2 3 4

1 2 3

1 2

(3)

Fill in this table:

Binary Search		Linear Search	
Advantages	*Disadvantages*	*Advantages*	*Disadvantages*
Is efficient on sorted data	Requires sorted data	Can work on any data	Not efficient
Is better for large amounts of data	Hard to Code	Simple to code	Not good for large amounts of data
	Not good for small data	Good for small data	