

1

Marks: 1

In DSA, the quicksort is _____ .

Choose one answer.

- ☒ a. an algorithm ✓
- ☐ b. a data structure of array ✗
- ☐ c. none of the above ✗

Correct

Marks for this submission: 1/1.

Question 2

Marks: 1

Calculate the result of Postfix expression:

$6\ 2\ -\ 3\ 1\ -\ 4\ /\ 2\ +\ *$

Choose one answer.

- ☐ a. 10 ✓
- ☐ b. 5 ✗
- ☐ c. 7 ✗
- ☒ d. 30 ✗

Incorrect

Marks for this submission: 0/1.

Question 3

Marks: 1

What is maximum number of nodes in level 4 of a binary tree could have?

Choose one answer.

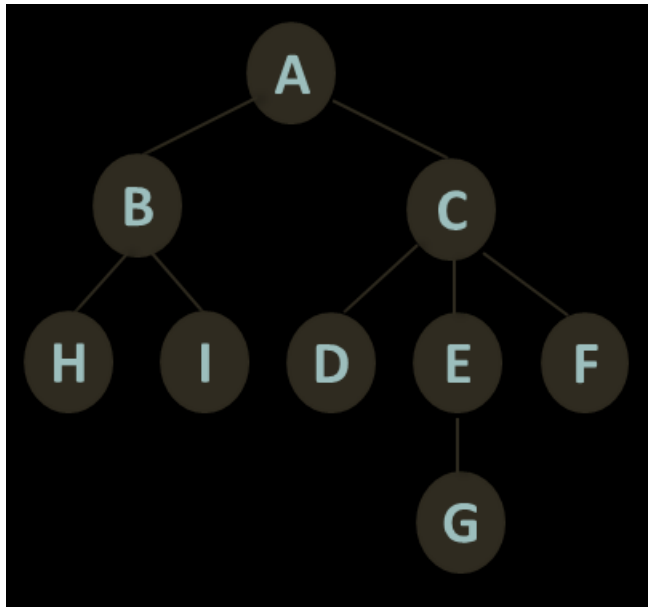
- ☒ a. 7 ✗
- ☐ b. 16 ✓
- ☐ c. I don't know ✗
- ☐ d. 4 ✗

Incorrect

Marks for this submission: 0/1.

Question 4

Marks: 1



In the picture, which statement is correct about (I):
Choose one answer.

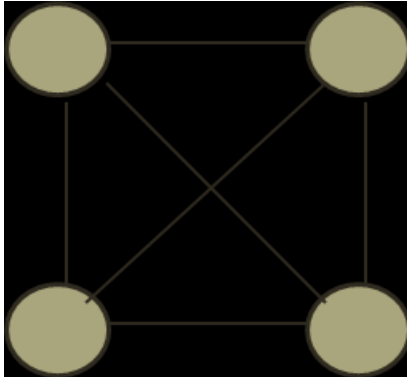
- ☒ a. (i) is the subtree of B ✓
- ☐ b. (I) has degree of 3 ✗
- ☐ c. (I) is the left child of B ✗

Correct

Marks for this submission: 1/1.

Question 5

Marks: 1



WHICH IS THE BEST DESCRIBE OF THE GRAPH?

Choose one answer.

- ☒ a. Unweighted, Undirected, Complete Graph ✓
- ☐ b. Unweighted, connected graph ✗
- ☐ c. Unweighted, undirected, connected graph ✗
- ☐ d. Complete Graph ✗

Correct

Marks for this submission: 1/1.

Question 6

Marks: 1

Generally in Bubble sort algorithm, how many time of sorting (pass) do we need to obtain the sorted array?

Choose one answer.

- ☐ a. $n/2$ ✗
- ☐ b. $n-1$ ✓
- ☐ c. $2n$ ✗
- ☒ d. $O(n^2)$ ✗

Incorrect

Marks for this submission: 0/1.

Question 7

Marks: 1

What is the implementation of following code:

```
1 void main()
2 { int i;
3 int A[10];
4
5 for (i=0;i<10;i++)
```

```
6 A[i]=i*i;
7 }
```

Choose one answer.

- ☐ a. array-based ✓
- ☒ b. nothing ✗
- ☐ c. reference-based ✗

Incorrect

Marks for this submission: 0/1.

Question 8

Marks: 1

What is the maximum nodes in this queue?

```
1. #define TOTAL_SLOTS 100
2. typedef struct queue Queue;
3. struct queue
4. { int front;
5. int rear;
6. int items[TOTAL_SLOTS];
7. };
```

Choose one answer.

- ☐ a. Don't know ✗
- ☒ b. 100 ✗
- ☐ c. n ✗
- ☐ d. 99 ✓

Incorrect

Marks for this submission: 0/1.

Question 9

Marks: 1

Which is the correct formular to evaluate the time complexity of QuickSort?

Choose one answer.

- ☒ a. $T(n) = T(n - i) + T(i) + \alpha n$ ✓
- ☐ b. $T(n) = 3T(n-1) + \alpha n$ ✗
- ☐ c. $T(n) = 2T(n/2) + cn$ ✗

Correct

Marks for this submission: 1/1.

Question 10

Marks: 3

```
//THIS FUNCTION IS TO MOVE the root value to make the whole tree a max-heap
// Some steps in the functions:
```

```
//x is the heap array, no. of elements = N
//Start considering the root node.
//The replacement candidate is Right (or Left) child of id2Down
// If replacement is not necessary then don't do it, stop trickling otherwise replace.
// Prepare for next trickling
```

```
void trickle_down (int x[ ], int N)
{
    _____ int id2Down, idReplace; //idReplace is child of id2Down
    _____ int temp; //for swapping data
    _____ id2Down = 0;
    _____ idReplace = 2* _____ +2;

    _____ while (idReplace <= N-1 )
    {
        _____ if (idReplace < N-1 && x[idReplace] < x[idReplace -1] )
            _____ idReplace _____;
        _____ if ( x[id2Down] >= x[idReplace] )
            _____ break;
        _____ temp = x[id2Down];
        _____ x[id2Down] = x[idReplace];
        _____ x[idReplace] = _____;

        _____ id2Down = idReplace;
        _____ idReplace = 2* _____ +2;
    }
}
```

Incorrect

Marks for this submission: 0/3.

Question 11

Marks: 1

WHICH PREQUISITE IS NEEDED BY DIJKSTRA ALGORITHM?

Choose one answer.

- ☐ a. Both of the above ✗
- ☒ b. Non-negative edge weights ✓
- ☐ c. Non cycles ✗
- ☐ d. No vertex with more than 4 edges ✗

Correct

Marks for this submission: 1/1.

Question 12

Marks: 1

This is an Array Representation of a Complete Binary Tree:



What is the left child of G:

Choose one answer.

- ☐ a. H ✗
- ☐ b. Z ✗
- ☒ c. D ✓
- ☐ d. E ✗

Correct

Marks for this submission: 1/1.

Question 13

Marks: 1

What is the complexity O of the following code:

```
for (i = 0; i < N; i++)  
for (j = 0; j < N * N; j++)  
sum++;
```

Choose one answer.

- ☐ a. N^2 ✗
- ☐ b. N ✗
- ☒ c. 1 ✗
- ☐ d. N^3 ✓

Incorrect

Marks for this submission: 0/1.

Question 14

Marks: 1

If we use Adjacency matrix for weighted undirected graph, we will have:

Choose one answer.

- ☒ a. An asymmetric matrix ✗
- ☐ b. None of the above ✗
- ☐ c. A symmetric matrix over its diagonal ✓

Incorrect

Marks for this submission: 0/1.

Question 15

Marks: 1

Calculate the result of Prefix expression:

$+ 10 * 5 + 2 3$

Choose one answer.

- ☐ a. 31 ✗
- ☒ b. 55 ✗
- ☐ c. 75 ✗
- ☐ d. 35 ✓

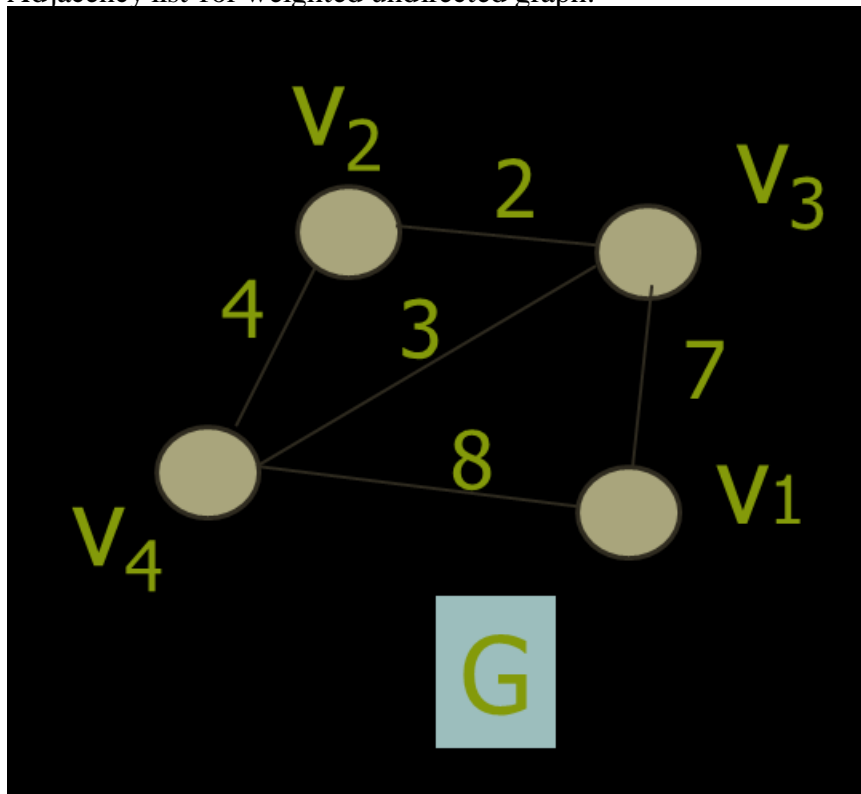
Incorrect

Marks for this submission: 0/1.

Question 16

Marks: 3

Adjacency list for weighted undirected graph:



Rule to fill the list:

-Increasing index of node

-Node format example v6(10)

- 1.[v1] --> [

v3(7)

] --> [

v4(8)

]
- 2.[v2] --> [

v3(2)

] --> [

v4(4)

]
- 3.[v3] --> [

v1(7)

] --> [

v2(2)

] --> [

v4(3)

]
- 4.[v4] --> [

v1(8)

] --> [

v3(7)

] --> [

v4(8)

]

Incorrect

Marks for this submission: 0/3.

Question 17

Marks: 1

What is true about array-based list and reference-based list?

Choose one answer.

- ☒ a. reference-based list is harder to perform lookup operation compared to array-based list

- ☐ b. They can be implemented by Java language only. ✗
- ☐ c. elements of array can be located dynamically and discontinuous like reference-based list ✗
- ☐ d. reference-based list is an other name of array-based list ✗

Correct

Marks for this submission: 1/1.

Question 18

Marks: 1

Given 2 result of a binary tree traversal:

preorder : YZCDEXBUTA

inorder : DCEZYUBTXA

What is the root node of the tree?

Choose one answer.

- ☒ a. B ✗
- ☐ b. X ✗
- ☐ c. Y ✓
- ☐ d. A ✗

Incorrect

Marks for this submission: 0/1.

Question 19

Marks: 3

//MERGE SORT:

//split the array into two roughly equal subarrays

//sort the subarrays by recursive applications of Mergesort and merge the sorted subarray

```
void merge-sort(int x[ ], int lower_bound, int upper_bound)
{
    _____ int pivote;
    _____ if (lower_bound != upper_bound)
    {
        _____ pivote = ( _____ + upper_bound) / _____;
        _____ merge-sort(x, lower_bound, _____);
        _____ merge-sort(x, _____ +1, upper_bound);
        _____ merge(x, lower_bound, pivote, upper_bound);
    }
}
```

z

Partially correct

Marks for this submission: 0.8/3.

Question 20

Marks: 1

What is number of nodes in a full binary tree of depth 4?
Choose one answer.

- ☒ a. 31 ✓
- ☐ b. 10 ✗
- ☐ c. 32 ✗
- ☐ d. 17 ✗

Correct

Marks for this submission: 1/1.

Question 21

Marks: 1

Given 2 result of a binary tree traversal:

preorder : YZCDEXBUTA

inorder : DCEZYUBTXA

What is the right child of node Z?

Choose one answer.

- ☐ a. T ✗
- ☒ b. Y ✗
- ☐ c. null ✓
- ☐ d. D ✗

Incorrect

Marks for this submission: 0/1.

Question 22

Marks: 1

In a Circular linked liste, if a Nodes (data, pointer) is a tail, the pointer points to _____.

Choose one answer.

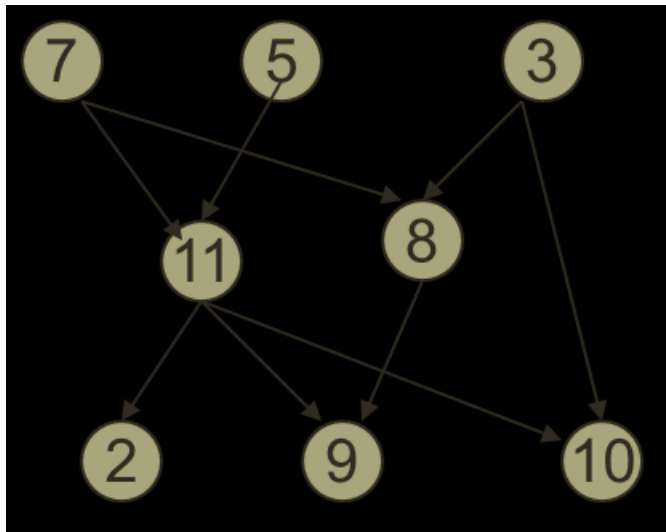
- ☐ a. tail ✗
- ☐ b. null ✗
- ☐ c. somewhere in the memory ✗
- ☒ d. head ✓

Correct

Marks for this submission: 1/1.

Question 23

Marks: 1



WHAT IS NOT THE RESULT OF TOPOLOGY SORT?

Choose one answer.

- ☒ a. 5, 7, 11, 2, 3, 8, 9, 10 ✗
- ☐ b. 5, 7, 3, 8, 11, 2, 9, 10 ✗
- ☐ c. 5, 7, 8, 11, 3, 2, 9, 10, ✓

Incorrect

Marks for this submission: 0/1.

Question 24

Marks: 3

//tree in-order traversal

//definition: intrav is the function to print all tree nodes using in-order, which follows the rules defined in lecture.

```

struct node {
int info;
struct node* left;
struct node* right;
}

```

```

void intrav(NodePtr tree)
{ if (tree != NULL)
{ intrav(tree->left);
ntrav(tree->info);
printf("%d\n", tree->right);
}
}

```

Partially correct

Marks for this submission: 1/3.

Question 25

Marks: 1

What is true about array-based list and reference-based list?

Choose one answer.

- ☐ a. for the same problem, reference-based list has larger size than array-based list. ✓
- ☒ b. reference-based list can not perform insertion and deletion ✗
- ☐ c. array-based list is lower cost of insertation but not deletion. ✗

Incorrect

Marks for this submission: 0/1.

Question 26

Marks: 1

Calculate the result of Postfix expression:

6 2 + 3 1 - 4 * 2 + *

Choose one answer.

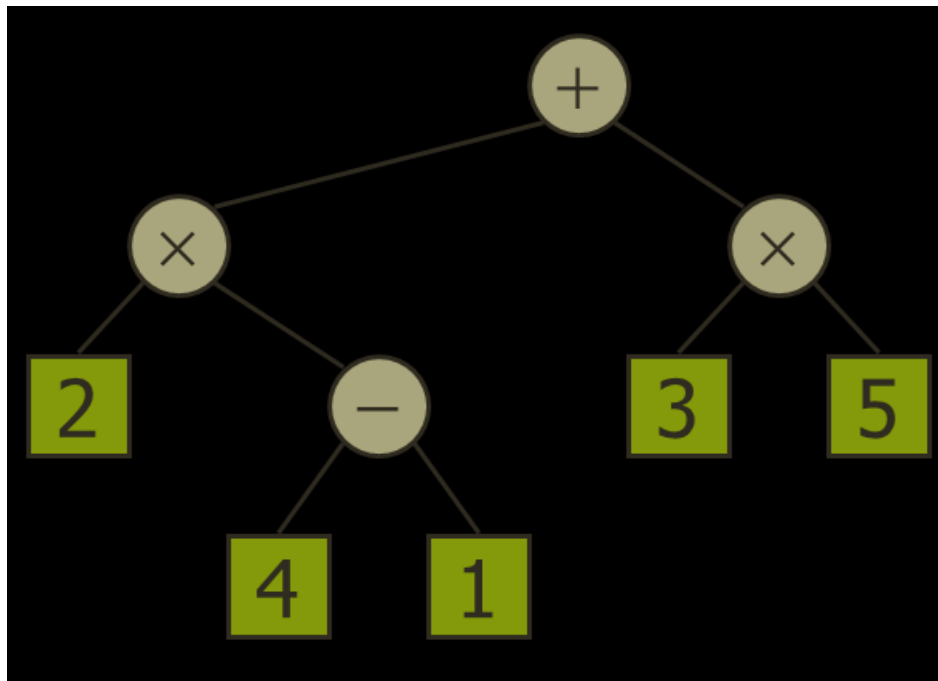
- ☒ a. 80 ✓
- ☐ b. 120 ✗
- ☐ c. 36 ✗
- ☐ d. 72 ✗

Correct

Marks for this submission: 1/1.

Question 27

Marks: 1



What is the result of this expression using binary tree:
Choose one answer.

- ☒ a. 21 ✓
- ☐ b. 50 ✗

☐ c. 12 ✗

☐ d. 40 ✗

Correct

Marks for this submission: 1/1.

Question 28

Marks: 1

A stack is similar to a list, especially they can both perform insertion a new node to the middle of the them.

Choose one answer.

☐ a. True ✗

☒ b. False ✓

Correct

Marks for this submission: 1/1.

Question 29

Marks: 1

In order to calculate the complexity of an algorithm, there are some steps that you should know. Please select the correct order of the step to calculate the complexity.

A. Perform the mathematical analysis to find the relationship between T and n

B. Simplify the result of complexity

C. Derive the mathematical formula of T from the code (or pseudo-code)

Choose one answer.

☐ a. B A C ✗

☐ b. A C B ✗

☒ c. C A B ✓

Correct

Marks for this submission: 1/1.

Question 30

Marks: 1

In ADT definition of FIFO queue, what operation can not be ignored?

Choose one answer.

☒ a. Insert() ✓

☐ b. Size() ✗

☒ c. IsFull() ✗

☐ d. All of the above ✗

Incorrect

Marks for this submission: 0/1.

Question 31

Marks: 1

What is the result of this code below:

```
-----  
for (int i=1; i<5; i++)  
{  
  for (int j = 1; j < 5-i; j++)  
  {  
    System.out.print("*"); //Similar to print in C  
  }  
  System.out.println(); //similar to print new line in C  
}
```

Choose one answer.

- a. //result:

☒ **
* ✓
- b. //result:
***** ✗
☐
- c. //result:
*
☐ **
*** ✗

Correct

Marks for this submission: 1/1.

Question 32

Marks: 1

What is true about Queue?

Choose one answer.

- ☒ a. It is FIFO ✗
- ☐ b. All of the above ✓
- ☐ c. It is a variation of List ✗

Incorrect

Marks for this submission: 0/1.

Question 33

Marks: 1

The _____ can't give us an upper bound on performance.

Choose one answer.

- ☒ a. Worst case ✗
- ☐ b. Best case ✓

Incorrect

Marks for this submission: 0/1.

Question 34

Marks: 1

What is the time complexity of Selection sort?

Choose one answer.

- ☐ a. $O(1)$ ✗
- ☐ b. $O(n/2 + n)$ ✗
- ☒ c. $O(n^2)$ ✓
- ☐ d. O 🙄 ✗

Correct

Marks for this submission: 1/1.

Question 35

Marks: 1

Dijkstra algorithm is to find the _____.

Choose one answer.

- ☒ a. shortest path based on edge weight ✓
- ☐ b. shortest path based on cloud computing ✗
- ☐ c. shortest path based on number of edges ✗

Correct

Marks for this submission: 1/1.

Question 36

Marks: 1

Given the Original array: 25, 12, 48, 37, 12, 92, 86, 33.

What is the output result after 1st pass of bubble sort:

Choose one answer.

- ☐ a. 25, 33, 48, 37, 12, 12, 86, 92. ✗
- ☒ b. 25, 12, 48, 37, 12, 33, 86, 92. ✗
- ☐ c. 25, 12, 48, 37, 12, 92, 86, 33. ✗
- ☐ d. 12, 25, 37, 12, 48, 86, 33, 92. ✓

Incorrect

Marks for this submission: 0/1.

Question 37

Marks: 3

//tree post order traversal




//definition: posttrav is the function to print all tree nodes using post-order, which follows the rules defined in lecture.

```
struct node {  
    int info;  
    struct node* left;  
    struct node* right;  
}
```

```
void posttrav(NodePtr tree)
```



```

{ if (tree != NULL)
{ posttrav(tree->);
posttrav(tree->);
printf("%d\n", tree->);
}
}

```

Correct

Marks for this submission: 3/3.

Question 38

Marks: 1







```

void bubblesort_checkpasses(int x[ ], int N)
{
int temp, i,j;
boolean switched = TRUE;
{...}
}

```

WITH THE INTRODUCTION OF A BOOLEAN VARIABLE switched , WHAT IS THE BEST CASE TIME COMPLEXITY OF THE CODE?

Choose one answer.

- ☐ a. $O(1)$  
- ☐ b. $O(n^2)$ 
- ☒ c. $O(1)$ 
- ☐ d. $O(\log n)$  

Incorrect

Marks for this submission: 0/1.