Government College University, Lahore
Data Structures and Algorithms (Practical)
Final Term Examination
Fall - 2021

Total Marks: 50

Duration: 150 minutes

Batch. 02	**Time Slot:** 10:30am to 01:00pm
Date: 22-Jan-2022	**Instructors:** Ms. Asma Kanwal, Ms. Tayyaba Fatima

Instructions:

1. All questions are compulsory.
2. All the questions hold 40 marks total.
3. Viva holds 10 marks.

Question 01. [15 marks]
Consider the following two arrays:

A

1	3	6	7	10

B

2	4	5	8	9

a) Write a function **mergeUs** that merges the arrays into another array C.

b) The resultant array i.e. C, must be a sorted array.

c) Print the array C.

d) Make a function **compCount** that counts and prints the number of key comparisons during sorting.

Question 02. [25 marks]
Consider a singly linked list having n nodes. The data items d1, d2, ..., dn are stored in the n nodes. A new data item d stored in a node with address Y is to be inserted at the beginning of the list.

a) Write a C++ program to implement the singly linked list.

b) Write a function to insert the node d at the head of the linked list.

c) Print the list before and after insertion.

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Date: 04-Nov-2021 Section: (B) **Instructor:** Tayyaba Fatima

Data Structures and Algorithms LAB

Quiz No. 01 – Section B

9.5

Duration: 1 hour	**Total Marks: 10**
All questions are compulsory.	
Each question contains 0.5 marks.	

Question No. 01: Which of the following can't store non-homogeneous data elements?

A) Function B) Operator C) Pointer (D) Array

Question No. 02: Assuming int is of 4bytes, what is the size of int arr[15]?

A) 15 B) 19 C) 11 (D) 60

Question No. 03: What will happen in the following C++ code snippet?

```
int a =100, b =200;
int *p = &a, *q = &b ;
p = q;
```

A) b is assigned to a (B) p now points to b

C) a is assigned to b D) q now points to a

Question No. 04: What will be the output?

```
int num = 10;
int *ptr;
ptr = &num;
cout<<&num<<"and"<<*ptr<<;
```

A) 10 and a memory address (B) A memory address and 10

C) A memory address and a memory address D) 10 and 10

Question No. 05: Which of the following gives the [value] stored at the address pointed to by the pointer: ptr?

A) valueAt(ptr) B) ptr C) &ptr (D) *ptr

Question No. 06: Consider Stack is implemented using the array. What will be the initial value with which top is initialized?

```
const int STACK_SIZE = 11;
int myStack[STACK_SIZE];
int top = _____;
```

A) 0 (B) -1 C) 1 D) Garbage Value

Question No. 07: Consider the following variables and find the wrong statement:

```
int nums, float avg;
int *ptr1, *ptr2;
void *ptr3;
```

A) `ptr1 = &nums` (B) `ptr2 = &avg` C) `ptr3 = &nums` D) `ptr3 = &avg`

Question No. 08: Which of the following is the correct identifier?

A) $var_name (B) VAR_123 C)varname@ · D) None of the above

Question No. 09: _____ is useful when data have to be stored and then retrieved in reverse order?

A) Function B) Array (C) Stack D) Heap

Question No. 10: Identify the base case and the recursive call to the following function:

```
int calculate (int paramOne){
  if (paramOne <= 1){
    return 1;
  }
else {
    return paramOne * calculate(paramOne - 2);
  }
```

Base Case

Recursive Call

Question No. 11: _____ will move largest value to its correct location (to the right).

(A) Bubble Sort B) Insertion Sort

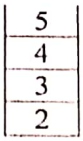
C) Selection Sort D) I don't know

Question No. 12: Predict the output?

```
int find[] = {1, 2, 3, 4};
int *p = (find + 2);
    cout << *p;
```

A) 1 B) 2 C) 3 D) 4

Question No. 13: Consider the stack, at this point, '*' is encountered. What will happen?



A) 20 is pushed into the stack
B) * is pushed into the stack
C) 2*3=6 is pushed into the stack
D) * is ignored

Question No. 14: Bubble sort involves the following:

A) Pair-wise comparisons
B) Swapping
C) Selection
D) A & B

Question No. 15: In bubble sort, we repeat the "bubble up" process _____times?

A) n B) n-1 C) n^2 D) 2n

Question No. 16: How does C++ stores a 2D array in memory?

A) Row major order B) Column major order C) Array order D) I don't know

Question No. 17: Which of the following is not the correct statement for a stack data structure

A) Arrays can be used to implement the stack
B) Stack follows FIFO
C) Elements are stored in a sequential manner
D) Top of the stack contains the last inserted element

Question No. 18: Predict the output?

```
float max; double min;
cout<<sizeof(max)<<" and "<<sizeof(min)<<" bytes";
```

A) 4 and 4 bytes B) 8 and 4 bytes C) 4 and 8 bytes D) 8 and 4 bytes

Question No. 19: Predict the output?

```
for (int i =0; i<5; i++ ){
  if(i%3 == 2)
       cout<<i;
  }
```

Answer: 2 5

Question No. 20: Predict the Output?

```
void swapNums(int *x, int *y)
{
      int temp = *x;
      *x=*y;
      *y=temp;
}

int main() {
        int firstNum = 10;
        int secondNum = 20;

      cout<<"Before swap: "<<"\n";
      cout<<firstNum<<secondNum<<"\n";

      swapNums(&firstNum, &secondNum);

      cout<<"After swap: "<<"\n";
      cout<<firstNum<<secondNum<<"\n";

  return 0;
}
```

Answer:

Before swap : 10 20

After swap : 20 10