

TCS Programming Model Paper

C Programming

1. What will be the output of the following C code?

```
1. #include <stdio.h>
2. int main()
3. {
4.     char buf[12];
5.     stderr = stdin;
6.     fscanf(stderr, "%s", buf);
7.     printf("%s\n", buf);
8. }
```

- a) Compilation error
- b) Undefined behaviour
- c) Whatever user types
- d) None of the mentioned

Answer: c

2. What will be the output of the following C code if the current system date is 6/22/2017?

```
#include<stdio.h>
#include<stdlib.h>
#include<time.h>
int main()
{
    time_t ct;
    time(&ct);
    struct tm *mt=localtime(&ct);
    printf("%d\n",mt-> tm_mon+2);
}
```

- a) 8
- b) 7
- c) 5
- d) 6

Answer: b

Explanation: Since the given date is 22nd of June, 2017. Since June is the sixth

month of the year, the output will be 5. (0-Jan, 1-Feb, 2-March, 4-April, 5-May, 6-June.....)

3. What will be the output of the following C code?

```
1.  #include <stdio.h>
2.  #include <math.h>
3.  int main()
4.  {
5.      int i = 10;
6.      printf("%f\n", log10(i));
7.      return 0;
8.  }
```

- a) Compile time error
- b) 1.000000
- c) 2.302585
- d) None of the mentioned

Answer: b

C++

4. What will be the output of the following C++ code?

```
1.  #include <iostream>
2.  using namespace std;
3.  int operate (int a, int b)
4.  {
5.      return (a * b);
6.  }
7.  float operate (float a, float b)
8.  {
9.      return (a / b);
10. }
11. int main ()
12. {
13.     int x = 5, y = 2;
14.     float n = 5.0, m = 2.0;
15.     cout << operate (x, y);
16.     cout << operate (n, m);
17.     return 0;
18. }
```

- a) 119
- b) 102.5
- c) 123.4
- d) 128.4

Answer: b

Explanation: In this program, We are overloading the function and getting the output as 10 and 2.5 by division and multiplication.

Output:

```
$ g++ call3.cpp
$ a.out
102.5
```

5. What does this template function indicates?

```
=====
template<class T>
void func(T a)
{
    cout<<a;
}
=====
```

- a) A function taking a single generic parameter and returning a generic type
- b) A function taking a single generic parameter and returning nothing
- c) A function taking single int parameter and returning a generic type
- d) A function taking a single generic parameter and returning a specific non-void type

Answer: b

Explanation: As the return type of function is void therefore function is not returning anything. Now as the function is taking a template T as its argument which is a general type, therefore, it is accepting a single general type argument.

Java

6. In the following Java code, which code fragment should be inserted at line 3 so that the output will be: "123abc 123abc"?

```
1. StringBuilder sb1 = new StringBuilder("123");
2. String s1 = "123";
3. // insert code here
4. System.out.println(sb1 + " " + s1);
```

- a) sb1.append("abc"); s1.append("abc");
- b) sb1.append("abc"); s1.concat("abc");
- c) sb1.concat("abc"); s1.append("abc");
- d) sb1.append("abc"); s1 = s1.concat("abc");

Answer: d

Explanation: append() is stringbuffer method and concat is String class method.
append() is stringbuffer method and concat is String class method.

7. What will be the output of the following Java code?

```
1. class Output
2. {
3.     public static void main(String args[])
4.     {
5.         double x = 3.14;
6.         int y = (int) Math.abs(x);
7.         System.out.print(y);
8.     }
9. }
```

- a) 0
- b) 3
- c) 3.0
- d) 3.1

Answer: b

Data Structures

8. What is the time complexity of the following code?

```

public boolean isBalanced(String exp)
{
    int len = exp.length();
    Stack<Integer> stk = new Stack<Integer>();
    for(int i = 0; i < len; i++)
    {
        char ch = exp.charAt(i);
        if (ch == '(')
            stk.push(i);
        else if (ch == ')')
        {
            if(stk.peek() == null)
            {
                return false;
            }
            stk.pop();
        }
    }
    return true;
}

```

- a) $O(\log n)$
- b) $O(n)$
- c) $O(1)$
- d) $O(n \log n)$

Answer: b

Explanation: All the characters in the string have to be processed, hence the complexity is $O(n)$.

9. What is a time complexity for inserting an alphabet in the tree using hash maps?
- a) $O(\log n!)$
 - b) $O(n!)$
 - c) $O(n^2)$
 - d) $O(1)$

Answer: d

Explanation: Suffix tree is also known as PAT tree or position tree. It allows fast string operation. Total time taken for construction of suffix tree is linear to the length of the tree. The time complexity for inserting an alphabet in the tree using hash maps is constant, $O(1)$.

CPP

10. What will be the output of the following C++ code?

```
1.  #include <iostream>
2.  #include <exception>
3.  #include <cstdlib>
4.  using namespace std;
5.  void myterminate ()
6.  {
7.      cerr << "terminate handler called";
8.      abort();
9.  }
10. int main (void)
11. {
12.     set_terminate (myterminate);
13.     throw 0;
14.     return 0;
15. }
```

- a) terminate handler called
- b) aborted
- c) both terminate handler & Aborted
- d) runtime error

Answer: c

Explanation: In this program, We are using set_terminate to abort the program.

Output:

```
$ g++ uce2.cpp
$ a.out
terminate handler called
Aborted
```