**Roll No…………….. Total No. of Pages:……**

**FUNDAMENTALS OF C PROGRAMMING**

**Time allowed: 90 Minutes Max. Marks: 40**

**General Instructions:**

* **Follow the instructions given in each section.**
* **Make sure that you attempt the questions in order.**

**SECTION-A (10\*1 mark=10 marks)**

***(All questions are compulsory)***

Q1 What does the keyword "void" indicate in a function declaration in C?

A) The function returns a value

B) The function takes no arguments

C) The function returns no value \*(Correct option)

D) The function takes a value

Q2 Which of the following data types in C can store decimal values?

A) int

B) char

C) float \*(Correct option)

D) None of the Above

Q3 What is the value of the expression (5 > 2) in C?

A) False

B) True

C) 0

D) 1 \*(Correct option)

Q4 What is the difference between a while loop and a for loop in C?

A) While loop checks the condition before executing the loop, for loop checks after executing the loop.

B) While loop executes the loop an undefined number of times, for loop a defined number of times. \*(Correct option)

C) While loop executes the loop a defined number of times, for loop an undefined number of times.

D) While loop checks the condition after executing the loop, for loop checks before executing the loop.

Q5 What is the output of the following code in C?

int x = 5;

printf("%d", x++);

A) 5 \*(Correct option)

B) 6

C) 10

D) 11

Q6 What is the data type of a variable in C language?

A) int

B) float

C) char

D) All of the above \*(Correct option)

Q7 What is the use of a semicolon in C language?

A) To denote the end of statements \*(Correct option)

B) To denote the end of a function

C) To denote the end of a program

D) None of the above

Q8 What is the purpose of the main() function in C language?

A) To initialize variables

B) To start the flow of a program \*(Correct option)

C) To call other functions

D) All of the above

Q9 What is the difference between an if statement and a switch statement in C language?

A) If statements can only be used for simple conditions, switch statements can handle complex conditions

B) If statements can only handle one condition, switch statements can handle multiple conditions

C) If statements can handle multiple conditions, switch statements can only handle one condition \*(Correct option)

D) None of the above

Q10 What is the purpose of a loop in C language?

A) To execute a set of statements multiple times \*(Correct option)

B) To check for conditions

C) To store data

D) None of the above

**SECTION-B (5\*2 mark=10 marks)**

***(All questions are compulsory)***

11.What type of loop is used when you want a piece of code to repeat an unknown number of times and the number of iterations is determined by the condition being checked?

a) for loop

b) while loop \*(Correct option)

c) do-while loop

d) repeat loop

12. What is the purpose of a function in C programming?

a) To perform a set of operations only once

b) To simplify complex code by breaking it down into smaller, reusable blocks \*(Correct option)

c) To control the flow of the program

d) To perform mathematical operations

13. What will be the output of the following code?

int x = 10;

int y = 20;

int \*ptr1 = &x;

int \*ptr2 = &y;

ptr1 = ptr2;

printf("%d %d", \*ptr1, \*ptr2);

a) 10 20

b) 20 20 \*(Correct option)

c) 10 10

d) 20 10

14. What will be the output of the following code?

int arr[5] = {10, 20, 30, 40, 50};

printf("%d", arr[3]);

a) 10

b) 20

c) 30

d) 40 \*(Correct option)

15. What will be the output of the following code?

char name[10] = "Hello";

printf("%c", name[8/2]);

a) 'H'

b) 'e'

c) 'o' \*(Correct option)

d) Garbage value

**SECTION-C(Coding Question) (2x5 marks=5 marks)**

Q16. Chaitanya and Chitrang are best friends. Today they came late and were not able to sit together in the classroom. Chitrang wants to communicate with Chaitanya during their C lecture. So he decided to write a message on the paper and send it to him. No one can stand up during the lecture. Hence message has to be sent through the students sitting in the classroom one by one. Students can delete some of the characters from the message. Chaitanya can only understand the whole message correctly if he gets the message containing the substring of the original message.

**Input:**

You have given two strings m1 and m2.

Where m1 is a message of length N sent by Chitrang and m2 is a message received by Chaitanya.

**Constraints:**

1 <= N <= 10^3

m1 and m2 contain only alphabets.

**Output:**

Print “Yes” if Chaitanya is able to get the full message. Else print “No”.

**Solution**

Sample test Cases

|  |  |  |
| --- | --- | --- |
|  | Input | Output |
| STC1 | abcdef  bcd | Yes |
| STC2 | abcdef  bdd | No |

**Solution 16:**

#include<stdio.h>

#include<stdbool.h>

bool solve(char\* s1, char\* s2)

{

int n=0,m=0;

while(s1[n] != '\0')

{

n++;

}

while(s2[m] != '\0')

{

m++;

}

if(m ==0)

return 1;

for(int i = 0; i < n ; i++){

int j = 0;

if(s1[i] == s2[0]){

int count = 0;

while(j < m && j + i < n){

if(s1[j + i] == s2[j])

count++;

j++;

}

if(count == m)

return 1;

}

}

return 0;

}

int main()

{

char s1[1000],s2[1000];

scanf("%s%s",s1,s2);

if(solve(s1,s2))

{

printf("Yes");

}

else

{

printf("No");

}

return 0;

}

Test Cases

|  |  |  |
| --- | --- | --- |
|  | Input | Output |
| TC1 | strst  rt | No |
| TC2 | s  s | Yes |
| TC3 | bbbbab  baba | No |
| TC4 | abbbbabbab  bbab | Yes |
| TC5 | ERTERbbabbab  erter | No |

Q17. Write a program to calculate and display the sum of the harmonic series for a given value of n:

1 + ½ + 1/3 + ¼ +….. +1/n.

The value of n should be given interactively through the terminal or command line..

**Input:**

Input n, is the number which controls the sum at any given point.

**Constraints:**

1 <= n <= 10^3

**Output:**

Sum of harmonic series

**Solution:**

#include <stdio.h>

int main()

{

int n;

float a,i;

printf("Input \t\t: ");

scanf("%d", &n);

while (!(n>0))

{

printf("\n\nEnter a POSITIVE Number : ");

scanf("%d", &n);

}

for (i=1; i<=n; i++)

{

a += (1.0/i);

}

printf("\nRequired Output : %f\n", a);

return 1;

}

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test Case 1 | Test Case 2 | Test Case 3 |
| Input | 3 | 99 | 999 |
| Output | 1.833333 | 5.177378 | 7.484478 |

**SECTION-D (Coding Question)(1x10 mark=10 mark)**

Q18 **Problem Statement: Write function to find the maximum and second maximum element in a one-dimensional array,The function should handle duplicates.**

**Sample Input**:

arr[] = {10, 20, 30, 40, 50} \\ array

**Sample Output**:

Max = 50

Second Max = 40

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test Case 1 | Test Case 2 | Test Case 3 |
| Input | arr[] = {10, 20, 30, 40, 50} | arr[] = {50, 40, 30, 20, 10} | Input: arr[] = {10, 10, 10, 10, 10} |
| Output | Max = 50  Second Max = 40 | Max = 50  Second Max = 40 | Max = 10  Second Max = 10 |

**Solution:**

#include <stdio.h>

void findMaxAndSecondMax(int arr[], int n, int \*max, int \*secondMax) {

if (arr[0] > arr[1]) {

\*max = arr[0];

\*secondMax = arr[1];

} else {

\*max = arr[1];

\*secondMax = arr[0];

}

for (int i = 2; i < n; i++) {

if (arr[i] > \*max) {

\*secondMax = \*max;

\*max = arr[i];

} else if (arr[i] > \*secondMax) {

\*secondMax = arr[i];

}

}

}

int main() {

int arr[] = {10, 20, 30, 40, 50};

int n = sizeof(arr) / sizeof(arr[0]);

int max, secondMax;

findMaxAndSecondMax(arr, n, &max, &secondMax);

printf("Max = %d\n", max);

printf("Second Max = %d\n", secondMax);

return 0;

}