**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 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

Q3 What is the purpose of a function in C language?

A) To break a program into smaller modules

B) To perform specific tasks \*(Correct option)

C) To store data

D) All of the above

Q4 What is the syntax for declaring an array in C language?

A) int array[10]; \*(Correct option)

B) float array;

C) char array[];

D) None of the above

Q5 What is the value of an uninitialized variable in C language?

A) 0

B) Garbage value \*(Correct option)

C) NULL

D) None of the above

Q6 What is the difference between a #define and a constant in C language?

A) #define is a preprocessor directive, constants are variables \*(Correct option)

B) Constants are preprocessor directives, #define is a variable

C) Both #define and constants are preprocessor directives

D) None of the above

Q7 What is the difference between a normal variable and a pointer variable in C language?

A) A normal variable holds a value, a pointer variable holds the address of a value \*(Correct option)

B) A pointer variable holds a value, a normal variable holds the address of a value

C) Both normal variables and pointer variables hold a value

D) None of the above

Q8 What is the difference between passing a pointer as an argument and passing an array as an argument in C language?

A) A pointer holds the address of a single variable, an array holds multiple variables \*(Correct option)

B) An array holds the address of a single variable, a pointer holds multiple variables

C) Both pointers and arrays hold the address of a single variable

D) None of the above

Q9 What is the purpose of the subscript operator ( [ ] ) in an array in C language?

A) To access elements of an array \*(Correct option)

B) To store elements in an array

C) To compare elements of an array

D) None of the above

Q10 Can you change the size of an array once it has been declared in C language?

A) Yes

B) No \*(Correct option)

C) Can be changed while passing to other functions

D) Cannot be changed only when passing to other functions

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

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

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

int arr[3][3] = {{1, 2, 3}, {4, 5, 6}, {7, 8, 9}};

printf("%d", \*(\*(arr+1)) + \*(\*(arr+2)));

a) 12

b) 11 \*(Correct option)

c) 10

d) 1

12.What is the output of the following C code?

#include <stdio.h>

int add(int \*a, int \*b)

{

\*a = \*a + \*b;

return \*a + \*b;

}

int main()

{

int x = 5, y = 10;

int result = add(&x, &y);

printf("Result is: %d", result);

return 0;

}

a) Result is: 5

b) Result is: 25 \*(Correct Option)

c) Result is: 15

d) Result is: 10

13.What is the output of the following C code?

#include <stdio.h>

int main()

{

int i = 1;

while (i <= 10)

{

if (i % 2 == 0)

{

i++;

continue;

}

printf("%d ", i);

i++;

if (i == 8)

{

break;

}

}

return 0;

}

a) 1 3 5 7 \*(Correct Option)

b) 2 4 6 8

c) 1 2 3 4 5 6 7 8

d) 3 5 7

14. What is the output of the following C code?

#include <stdio.h>

#include <string.h>

int main()

{

char str1[20] = "Turing";

char str2[20] = "Block";

strcat(str2, str2);

printf("%s", str1);

return 0;

}

a) Turing

b) BlockBlock \*(Correct Option)

c) Block

d) BlockTuring

15. What is a string in C programming?

a) An array of characters terminated by a null character '\0'. (Correct Option)

b) An array of characters not terminated by any character.

c) A character constant

d) A single character

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

Q16. Chaitanya has a N\*N matrix. He wants to print the jth diagonal. jth diagonal means a diagonal which starts from the (0,j)th cell and goes in the right-diagonal direction.

Give a N\*N square matrix, return an array of its jth diagonals. Look at the example for more details.

**Input:**

The first line contains two integers N and j.

Second line contain a matrix of size N\*N.

**Constraints:**

1 <= N<= 10000 <= A[i][j] <= 10^5

0<=j<N

**Output:**

Print all elements of jth anti diagonal space separated in a single line.

Sample test Cases

|  |  |  |
| --- | --- | --- |
|  | Input | Output |
| STC1 | 5 2  1 2 3 4 5  2 3 4 5 1  8 7 0 9 8  6 7 8 5 6  6 17 2 12 2 | 3 5 8 |
| STC2 | 3 0  0 9 8  8 5 6  2 12 2 | 0 5 2 |

**Solution 16:**

#include<stdio.h>

void solve(int n,int j, int a[][n])

{

int i=0;

while(j<n && i<n)

{

printf("%d ",a[i][j]);

i++;

j++;

}

}

int main()

{

int n,j;

scanf("%d%d",&n,&j);

int a[n][n];

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

{

for(int j=0;j<n;j++)

{

scanf("%d",&a[i][j]);

}

}

solve(n,j,a);

return 0;

}

**Test Cases**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test Case 1 | Test Case 2 | Test Case 3 |
| Input | 5 1  1 2 3 4  5 3 4 3  2 3 4 5  6 5 4 3 | 3 0  1 2 3  5 4 3  2 3 5 | 1 0  1 |
| Output | 2 4 5 | 1 4 5 | 1 |

Q17. Suppose you take an input from the user an array size and elements , that array contains n number of elements, array elements might be repetitive. Your job is to print all unique elements

**Input:**

Input n, number of elements in the array

Enter numbers for given input n from keyboard or command line

**Constraints:**

**1 <= n <= 100**

**Output:**

Print unique elements of array

Example -

Input -

Enter size of array: 5

Enter elements in array: 1

1

2

2

3

Output-

Unique elements in the array are: 3

**Solution:**

/\*\*

\* C program to print all unique elements in array

\*/

#include <stdio.h>

#define MAX\_SIZE 100

int main()

{

int arr[MAX\_SIZE], freq[MAX\_SIZE];

int size, i, j, count;

/\* Input size of array and elements in array \*/

printf("Enter size of array: ");

scanf("%d", &size);

printf("Enter elements in array: ");

for(i=0; i<size; i++)

{

scanf("%d", &arr[i]);

freq[i] = -1;

}

/\* Find frequency of each element \*/

for(i=0; i<size; i++)

{

count = 1;

for(j=i+1; j<size; j++)

{

if(arr[i] == arr[j])

{

count++;

freq[j] = 0;

}

}

if(freq[i] != 0)

{

freq[i] = count;

}

}

/\* Print all unique elements of array \*/

printf("\nUnique elements in the array are: ");

for(i=0; i<size; i++)

{

if(freq[i] == 1)

{

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

}

}

return 0;

}

Test Cases

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test Case 1 | Test Case 2 | Test Case 3 |
| Input | Enter size of array: 5  Enter elements in array: 1  1  2  2  3 | Enter size of array: 2  Enter elements in array: 1  1  1 | Enter size of array: 3  Enter elements in array: 1  1  2  3 |
| Output | Unique elements in the array are: 3 | Unique elements in the array are: | Unique elements in the array are: 3 |

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

Q18 **Problem Statement: Write a program in C to print an outline diamond pattern using asterisks (\*).**

**Sample Input**:

height = 7

**Sample Output**:

\*

\* \*

\* \*

\* \*

\* \*

\* \*

\*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Test Case 1 | Test Case 2 | Test Case 3 |
| Input | 7 | 5 | 9 |
| Output | \*  \* \*  \* \*  \* \*  \* \*  \* \*  \* | \*  \* \*  \* \*  \* \*  \* | \*  \* \*  \* \*  \* \*  \* \*  \* \*  \* \*  \* \*  \* |

**Solution:**

#include <stdio.h>

void printOutlineDiamond(int height) {

int mid = height / 2 + 1;

for (int i = 1; i <= height; i++) {

if (i < mid) {

for (int j = mid - i; j >= 1; j--) {

printf(" ");

}

printf("\*");

for (int k = 1; k <= 2 \* (i - 1) - 1; k++) {

printf(" ");

}

printf("\*");

} else if (i == mid) {

for (int j = 1; j <= height; j++) {

printf("\*");

}

} else {

for (int j = 1; j <= i - mid; j++) {

printf(" ");

}

printf("\*");

for (int k = height - 2 \* (i - mid) - 2; k >= 1; k--) {

printf(" ");

}

printf("\*");

}

printf("\n");

}

}

int main() {

int height = 7;

printOutlineDiamond(height);

return 0;

}