# Ramakrishna Mission Vivekananda Centenary College Rahara, Kolkata-118

## LAB ASSIGNMENT COPY

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Roll – 737

Paper Code - UGCMSMC01

Paper Name - Major Course 1

Semester – 1

Year - 2023-24

Programming Fundamentals using C Lab

Dept-CS Sem-1st

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| 1. | Write a c program to print the sum of two numbers where the numbers will be given by the user. | | |
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| | Control Flow and Loop | | |
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| 8. | Write a c program to make a simple calculator. | | |
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| 10. | Write a c program to calculate the sum of n natural numbers. The inputs will be provided by the user. | | |
| 11. | Write a c program to find factorial of a given number. | | |
| 12. | Write a c program to reverse a given number. | | |
| 13. | Write a c program to print the day of 1st January of any year inputted by the user, considering the first January of 1900 is Monday. | | |
| 14. | Write a c program to display Armstrong numbers between 1 to 1000 | | |
| 15. | Write a C program to check a given number is palindrome or not. | | |
| 16. | Write a C program to print the following pattern for n number of lines where n will be given by the user:<br>*<br>* *<br>* * *<br>* * * * | | |
| 17. | Write a C program to print the following pattern for n number of lines where n will be given by the user:<br>  *<br>  * *<br>  * * *<br>* * * * | | |



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| | | | |
|---|---|---|---|
| 18. | Write a C program to print the following pattern for n number of lines where n will be given by the user:<br>2<br>4 6<br>12 14 16<br>32 34 36 38 | | |
| 19. | Write a C program to print the following pattern for n number of lines where n will be given by the user:<br>1<br>23<br>456<br>78910 | | |
| | Functions and pointers | | |
| 20. | Write a C program to find out the area and perimeter of a rectangle using two different functions. | | |

| | | | |
|---|---|---|---|
| 21. | Write a C Program to find the cube and square root of a number using two different functions without using the standard math library functions. | | |
| 22. | Write a C program to calculate simple interest using function. The amount, rate of interest and number of year's term will be given by the user. | | |
| 23. | Write a C program to swap two numbers using call by reference | | |
| | Arrays & String | | |
| 24. | Write a c Program to search a particular element in an Array. | | |
| 25. | Write a c Program to Find the Maximum and Minimum in an Array. | | |
| 26. | Write a c program to get n number of integers from the user and store them in an array. Now, do the addition and the multiplication of the entire array element and show the results. 0<n<100 | | |
| 27. | Write a c program to multiply two matrices | | |
| 28. | Write a c program to create a square matrix of size m dynamically. Value of m will be provided by the user. Calculate the sum of all the left diagonal elements of the sum of all the right diagonal elements of the matrix. Print the two sums. | | |
| 29. | Write a c program to find the length of a string without strlen() function | | |
| 30. | Write a c program to compare two strings lexicographically | | |
| 31. | Write a c program to reverse a string without the library function. | | |
| | Structures and Unions | | |
| 32. | Write a c program to create your data type to store data of 10 books and print the data in proper format. | | |
| 33. | Write a c program to store student records as structures and sort them by age or roll number. | | |
| | File and Command line Arguments | | |
| 34. | Write a c program to copy one file into another file where the file names will be provided through command line. The input will be like: mycopy<source file><destination file> | | |
| 35. | Write a c program to read and write stored student record into a file. | | |

**Roll-737**
**Sem-1**
**Year-2023**

1. Write a c program to print the sum of two numbers where the numbers will be given by the user.

CODE-

```
#include <stdio.h>
int main() {
  int num1, num2, sum;
  printf("Enter two numbers: ");
  scanf("%d %d", &num1, &num2);
  sum = num1 + num2;
  printf("The sum of the two numbers is %d\n", sum);
  return 0;
}
```

OUTPUT-

```
Enter two numbers: 5 13
The sum of the two numbers is 18
```

2. Write a c program to swap two numbers using third variable or without third variable

CODE_1-

```
#include <stdio.h>
int main() {
  int num1, num2, temp;
  printf("Enter two numbers: ");
  scanf("%d %d", &num1, &num2);
  temp = num1;
  num1 = num2;
  num2 = temp;
  printf("After swapping, the first number is %d and the second number is %d\n",
num1, num2);
  return 0;
}
```

OUTPUT-

```
Enter two numbers: 13 19
After swapping, the first number is 19 and the second number is 13
```

CODE_2-

```
#include <stdio.h>
int main() {
  int num1, num2;
  printf("Enter two numbers: ");
  scanf("%d %d", &num1, &num2);
  num1 = num1 + num2;
  num2 = num1 - num2;
  num1 = num1 - num2;
```

```
  printf("After swapping, the first number is %d and the second number is %d\n",
num1, num2);
  return 0;
}
```

OUTPUT-

```
Enter two numbers: 36 98
After swapping, the first number is 98 and the second number is 36
```

3. Write a c program to find the size of int, float, double, and char

CODE-

```
#include <stdio.h>
int main() {
  int int_size = sizeof(int);
  float float_size = sizeof(float);
  double double_size = sizeof(double);
  char char_size = sizeof(char);
  printf("The size of int is %lu bytes\n", int_size);
  printf("The size of float is %lu bytes\n", float_size);
  printf("The size of double is %lu bytes\n", double_size);
  printf("The size of char is %lu bytes\n", char_size);
  return 0;
}
```

OUTPUT-

```
The size of int is 4 bytes
The size of float is 0 bytes
The size of double is 0 bytes
The size of char is 1 bytes
```

4. Write a c program to print the ASCII value of a character

CODE-

```
#include <stdio.h>
int main() {
  char c;
  printf("Enter a character: ");
  scanf("%c", &c);
  printf("The ASCII value of %c is %d\n", c, c);
  return 0;
}
```

OUTPUT-

```
Enter a character: r
The ASCII value of r is 114
```

5. Write a c program to check whether a given number is even or odd.

CODE-

```
#include <stdio.h>
int main() {
  int num;
  printf("Enter a number: ");
  scanf("%d", &num);
  if (num % 2 == 0) {
    printf("%d is an even number.\n", num);
  } else {
    printf("%d is an odd number.\n", num);
  }
  return 0;
}
```

OUTPUT-

```
Enter a number: 25
25 is an odd number.
```

6. Write a c program to find largest number among three numbers using ternary operator and smallest among them using nested if-else.

CODE_1-

```
#include<stdio.h>
int main(){
    int a , b , c , g;
    printf("Value of a , b , c = ");
    scanf("%d%d%d",&a,&b,&c);
    g=(a>b)?((a>c)?a:c):((b>c)?b:c);
    printf("Largest = %d",g);
}
```

OUTPUT-

```
Value of a , b , c = 23 29 37
Largest = 37
```

CODE_2-

```
#include <stdio.h>
int main() {
  int num1, num2, num3, smallest;
  printf("Enter three numbers: ");
  scanf("%d %d %d", &num1, &num2, &num3);
  if (num1 < num2 && num1 < num3) {
    smallest = num1;
  } else if (num2 < num1 && num2 < num3) {
    smallest = num2;
  } else {
    smallest = num3;
  }
```

```
  printf("The smallest number is %d\n", smallest);
  return 0;
}
```

OUTPUT-

```
Enter three numbers: 39 38 19
The smallest number is 19
```

7. Write a c program to check leap year of a given year.

CODE-

```
#include <stdio.h>
int main() {
  int year;
  printf("Enter a year: ");
  scanf("%d", &year);
  if ((year % 4 == 0 && year % 100 != 0) || year % 400 == 0) {
    printf("%d is a leap year.\n", year);
  } else {
    printf("%d is not a leap year.\n", year);
  }
  return 0;
}
```

OUTPUT-

```
Enter a year: 2023
2023 is not a leap year.
```

8. Write a c program to make a simple calculator.

CODE-

```
#include <stdio.h>
int main() {
  char operator;
  float num1, num2, result;
  printf("Enter an operator (+, -, *, /): ");
  scanf("%c", &operator);
  printf("Enter two numbers: ");
  scanf("%f %f", &num1, &num2);
  switch (operator) {
    case '+':
      result = num1 + num2;
      break;
    case '-':
      result = num1 - num2;
      break;
    case '*':
      result = num1 * num2;
      break;
    case '/':
```

```
      result = num1 / num2;
      break;
    default:
      printf("Invalid operator.\n");
      break;
  }

  printf("The result is: %f\n", result);
  return 0;
}
```

OUTPUT-

```
Enter an operator (+, -, *, /): /
Enter two numbers: 39 6
The result is: 6.500000
```

9. Write a c program to check whether a given number is prime or not

CODE-

```
#include<stdio.h>
int main(){
   int n,i,m=0,pn=0;
   printf("Enter a Number=");
   scanf("%d",&n);
   m=n/2;
   if(n>1){
      for (i = 2; i < m; i++)
      {
         if (n%i==0)
         {
            printf("Not a Prime Number");
            pn=1;
            break;
         }

      }
      if (pn==0)
      {
         printf("Prime Number");
      }
   }
   else
   {
      printf("Not a Prime Number");
   }
   return 0;
}
```

OUTPUT-

```
Enter a Number=11
```

Prime Number

10. Write a c program to calculate the sum of n natural numbers. The inputs will be provided by the user.

CODE-

```
#include <stdio.h>
int main() {
  int n, i, sum;
  printf("Enter a number: ");
  scanf("%d", &n);
  sum = 0;
  for (i = 1; i <= n; i++) {
    sum += i;
  }
  printf("The sum of the first %d natural numbers is %d.\n", n, sum);
  return 0;
}
```

OUTPUT-

```
Enter a number: 18
The sum of the first 18 natural numbers is 171.
```

11. Write a c program to find factorial of a given number.

CODE-

```
#include <stdio.h>
int main() {
  int num, fact;
  printf("Enter a number: ");
  scanf("%d", &num);
  fact = 1;
  for (int i = 1; i <= num; i++) {
    fact *= i;
  }
  printf("The factorial of %d is %d.\n", num, fact);
  return 0;
}
```

OUTPUT-

```
Enter a number: 5
The factorial of 5 is 120.
```

12. Write a c program to reverse a given number.

CODE-

```
#include <stdio.h>
int main() {
  int num, rev, rem;
  printf("Enter a number: ");
```

```
  scanf("%d", &num);
  rev = 0;
  while (num != 0) {
    rem = num % 10;
    rev = rev * 10 + rem;
    num /= 10;
  }
  printf("The reversed number is %d.\n", rev);
  return 0;
}
```

OUTPUT-

```
Enter a number: 2369
The reversed number is 9632.
```

13. Write a c program to print the day of 1st January of any year inputted by the user, considering the first January of 1900 is Monday.

CODE-

```
#include<stdio.h>
int main(){
int year, year_gap, leap=0, total_day, ref_2=400, ref=1900, day;
printf("enter a year greater than 1900 = ");
scanf("%d",&year);
if(year>ref)
{
year_gap=year-ref;
for(;ref<year;ref++)
{
if(ref%400==0 || ref%100!=0 && ref%4==0)
{
leap++;
}
}
total_day=((year_gap-leap)*365)+(leap*366);
day=total_day%7;
switch(day)
{
case 0:
printf("Monday");
break;
case 1:
printf("Tuesday");
break;
case 2:
printf("Wednesday");
break;
case 3:
printf("Thursday");
```

```
break;
case 4:
printf("Friday");
break;
case 5:
printf("Saturday");
break;
case 6:
printf("Sunday");
break;
}
}
return 0;
}
```

OUTPUT-

```
enter a year greater than 1900 = 2023
Sunday
```

14. Write a c program to display Armstrong numbers between 1 to 1000

CODE-

```
#include <stdio.h>
int main() {
  int num, sum;
  for (int i = 1; i <= 1000; i++) {
    num = i;
    sum = 0;
    while (num > 0) {
      int rem = num % 10;
      sum += rem * rem * rem;
      num /= 10;
    }
    if (sum == i) {
      printf("%d is an Armstrong number\n", i);
    }
  }
  return 0;
}
```

OUTPUT-

```
1 is an Armstrong number
153 is an Armstrong number
370 is an Armstrong number
371 is an Armstrong number
407 is an Armstrong number
```

15. Write a C program to check a given number is palindrome or not.

CODE-

```
#include <stdio.h>
int main() {
  int num, rev=0, rem, ex;
  printf("Enter a number: ");
  scanf("%d", &num);
  ex = num;
  while (num != 0) {
    rem = num % 10;
    rev = rev * 10 + rem;
    num /= 10;
  }
  if (ex == rev) {
    printf("%d is a palindrome number.\n", ex);
  } else {
    printf("%d is not a palindrome number.\n", ex);
  }
  return 0;
}
```

OUTPUT-

```
Enter a number: 121
121 is a palindrome number.
```

16. Write a C program to print the following pattern for n number of lines where n will be given by the user:

```
*

* *

* * *

* * * *
```

CODE-

```
#include <stdio.h>
int main() {
  int n;
  printf("Enter the number of lines: ");
  scanf("%d", &n);
  for (int i = 1; i <= n; i++) {
    for (int j = 1; j <= i; j++) {
      printf("*");
    }
    printf("\n");
  }
```

```
  return 0;
}
```

OUTPUT-

```
Enter the number of lines: 4
*
**
***
****
```

17. Write a C program to print the following pattern for n number of lines where n will be given by the user:

```
    *

   * *

  * * *

 * * * *
```

CODE-

```
#include <stdio.h>
int main() {
  int n;
  printf("Enter the number of lines: ");
  scanf("%d", &n);
  for (int i = 1; i <= n; i++) {
    for (int j = 1; j <= n - i; j++) {
      printf(" ");
    }
    for (int j = 1; j <= i; j++) {
      printf("*");
    }
    printf("\n");
  }
  return 0;
}
```

OUTPUT-

```
Enter the number of lines: 4
    *
   **
  ***
 ****
```

18. Write a C program to print the following pattern for n number of lines where n will be given by the user:

2

4 6

12 14 16

32 34 36 38

CODE-

```
#include<stdio.h>
int main()
{
    int n,i,j,a=2;
    printf("Enter a Number:");
    scanf("%d",&n);
    for(i=1;i<=n;i++)
    {
            for(j=1;j<=i;j++)
            {
                    printf("%d",a);
                    printf(" ");
          if(i!=j)
          {
            a=a+2;
               }
       }
       a=a*2;
            printf("\n");
    }
    return 0;
}
```

OUTPUT-

```
Enter a Number:4
2
4 6
12 14 16
32 34 36 38
```

19. Write a C program to print the following pattern for n number of lines where n will be given by the user:

1

2 3

4 5 6

7 8 9 10

CODE-

```
#include <stdio.h>
int main() {
  int n;
  printf("Enter the number of lines: ");
  scanf("%d", &n);
  int num = 1;
  for (int i = 1; i <= n; i++) {
    for (int j = 1; j <= i; j++) {
      printf("%d ", num);
      num++;
    }
    printf("\n");
  }
  return 0;
}
```

OUTPUT-

```
Enter the number of lines: 4
1
2 3
4 5 6
7 8 9 10
```

20. Write a C program to find out the area and perimeter of a rectangle using two different functions.

CODE-

```
#include <stdio.h>
int area(int length, int breadth) {
  return length * breadth;
}
int perimeter(int length, int breadth) {
  return 2 * (length + breadth);
}
int main() {
  int length, breadth;
  printf("Enter the length of the rectangle: ");
  scanf("%d", &length);
  printf("Enter the breadth of the rectangle: ");
  scanf("%d", &breadth);
  int area_of_rectangle = area(length, breadth);
  int perimeter_of_rectangle = perimeter(length, breadth);
  printf("The area of the rectangle is: %d\n", area_of_rectangle);
  printf("The perimeter of the rectangle is: %d\n", perimeter_of_rectangle);
```

```
  return 0;
}
```

OUTPUT-

```
Enter the length of the rectangle: 5
Enter the breadth of the rectangle: 6
The area of the rectangle is: 30
The perimeter of the rectangle is: 22
```

21. Write a C Program to find the cube and square root of a number using two different functions without using the standard math library functions.

CODE-

```
#include <stdio.h>
int cube(int num) {
  int cube = num * num * num;
  return cube;
}
int squareRoot(int num) {
  int sqrt = 0;
  for (int i = 1; i * i <= num; i++) {
    sqrt = i;
  }
  return sqrt;
}
int main() {
  int number;
  printf("Enter a number: ");
  scanf("%d", &number);
  int cubeResult = cube(number);
  printf("Cube of %d is: %d\n", number, cubeResult);
  int sqrtResult = squareRoot(number);
  printf("Square root of %d is: %d\n", number, sqrtResult);
  return 0;
}
```

OUTPUT-

```
Enter a number: 25
Cube of 25 is: 15625
Square root of 25 is: 5
```

22. Write a C program to calculate simple interest using function. The amount, rate of interest and number of year's term will be given by the user.

CODE-

```
#include <stdio.h>
float calculate_simple_interest(float principal, float rate, int years) {
  return (principal * rate * years) / 100;
}
int main() {
```

```
  float principal, rate, interest;
  int years;
  printf("Enter principal amount: ");
  scanf("%f", &principal);
  printf("Enter rate of interest: ");
  scanf("%f", &rate);
  printf("Enter number of years: ");
  scanf("%d", &years);
  interest = calculate_simple_interest(principal, rate, years);
  printf("Simple interest: %.2f\n", interest);
  return 0;
}
```

OUTPUT-

```
Enter principal amount: 25000
Enter rate of interest: 5
Enter number of years: 5
Simple interest: 6250.00
```

23. Write a C program to swap two numbers using call by reference

CODE-

```
#include<stdio.h>
void swap(int *x , int *y)
    {
            *x=*x+*y;
            *y=*x-*y;
            *x=*x-*y;
    }
int main()
    {
            int a , b ;
            printf("Enter the value of a & b = ");
            scanf("%d%d",&a,&b);
            swap(&a,&b);
            printf("Current value of a = %d\n",a);
            printf("Current value of b = %d\n",b);
    }
```

OUTPUT-

```
Enter the value of a & b = 5 9
Current value of a = 9
Current value of b = 5
```

24. Write a c Program to search a particular element in an Array.

CODE-

```
#include <stdio.h>
int main() {
  int array[100], element, size, found = 0;
```

```
  int i ;
  printf("Enter the size of the array: ");
  scanf("%d", &size);
  printf("Enter the elements of the array: ");
  for (i = 0; i < size; i++) {
    scanf("%d", &array[i]);
  }
  printf("Enter the element to search: ");
  scanf("%d", &element);
  for (i = 0; i < size; i++) {
    if (array[i] == element) {
      found = 1;
      break;
    }
  }
  if (found == 1) {
    printf("The element is present in the array at index %d.\n", i);
    printf("The element is %d.\n", array[i]);
  } else {
    printf("The element is not present in the array.\n");
  }
  return 0;
}
```

OUTPUT-

```
Enter the size of the array: 5
Enter the elements of the array: 1 2 3 4 5
Enter the element to search: 3
The element is present in the array at index 2.
The element is 3.
```

25. Write a c Program to Find the Maximum and Minimum in an Array.

CODE-

```
#include <stdio.h>
int main() {
  int array[100], size, max, min;
  printf("Enter the size of the array: ");
  scanf("%d", &size);
  printf("Enter the elements of the array: ");
  for (int i = 0; i < size; i++) {
    scanf("%d", &array[i]);
  }
  max = array[0];
  min = array[0];
  for (int i = 1; i < size; i++) {
    if (array[i] > max) {
```

```
      max = array[i];
    }

    if (array[i] < min) {
      min = array[i];
    }
  }
  printf("The maximum element in the array is %d.\n", max);
  printf("The minimum element in the array is %d.\n", min);
  return 0;
}
```

OUTPUT-

```
Enter the size of the array: 5
Enter the elements of the array: 1 2 3 4 5
The maximum element in the array is 5.
The minimum element in the array is 1.
```