**SAVEETHA SCHOOL OF ENGINEERING**

**SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES**

**DEPARTMENT OF DATA SCIENCE**

**INSTITUTE OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE**

| **Course Code** | **DSA0129** | **Course Title** | | **Object Oriented Programming with C++ for Solving Problems** | |
| --- | --- | --- | --- | --- | --- |
| **Branch** | **B.Tech-CSE/IT/AI&DS/AI&ML** | | **Year\Academic year** | | **I Year/2022** |

**DAY - 2 - Practice Programs**

1. Write a C++ program to print the given number in reverse order. Use functions with return type and without return type for reversing the number

Program:

**#include <iostream>**

**using namespace std;**

**int main()**

**{**

**int n, reverse=0, rem;**

**cout<<"Enter a number: ";**

**cin>>n;**

**while(n!=0)**

**{**

**rem=n%10;**

**reverse=reverse\*10+rem;**

**n/=10;**

**}**

**cout<<"Reversed Number: "<<reverse<<endl;**

**return 0;**

**}**

**Output:**

**Sample input : 1 2 3 4**

**Sample out put:4 3 2 1**

1. Write a program in C++ to calculate the area of circle, rectangle, square and triangle using function overloading.

**programme**

#include<iostream>

using namespace std;

int area(int);

int area(int,int);

float area(float);

float area(float,float);

int main()

{

int s,l,b;

float r,bs,ht;

cout<<"Enter side of a square:";

cin>>s;

cout<<"Enter length and breadth of rectangle:";

cin>>l>>b;

cout<<"Enter radius of circle:";

cin>>r;

cout<<"Enter base and height of triangle:";

cin>>bs>>ht;

cout<<"Area of square is"<<area(s);

cout<<"\nArea of rectangle is "<<area(l,b);

cout<<"\nArea of circle is "<<area(r);

cout<<"\nArea of triangle is "<<area(bs,ht);

}

int area(int s)

{

return(s\*s);

}

int area(int l,int b)

{

return(l\*b);

}

float area(float r)

{

return(3.14\*r\*r);

}

float area(float bs,float ht)

{

return((bs\*ht)/2);

}

**output**

Enter side of a square:4

Enter length and breadth of rectangle:4 6

Enter radius of circle:6

Enter base and height of triangle:2 4

Area of square is16

Area of rectangle is 24

Area of circle is 113.04

Area of triangle is 4

1. Write a C++ program to perform different arithmetic operations such as addition, subtraction, division, modulus and multiplication using inline functions.

**#include<iostream>**

**using namespace std;**

**int main()**

**{**

**int a,b,input;**

**float div;**

**cout<<"CALCULATOR\n\n1 - add\n2 - substract\n3 - multiplication\n4 - division\n5 - modulas\n";**

**cout<<"ENTER THE OPERATION => ";**

**cin>>input;**

**cout<<"\nNUMBER 1 : ";**

**cin>>a;**

**cout<<"\nNUMBER 2 : ";**

**cin>>b;**

**switch(input)**

**{**

**case 1:**

**cout<<a<<" + "<<b<<" = "<<(a+b);**

**break;**

**case 2:**

**cout<<a<<" - "<<b<<" = "<<(a-b);**

**break;**

**case 3:**

**cout<<a<<" x "<<b<<" = "<<(a\*b);**

**break;**

**case 4:**

**div=(float)a/(float)b;**

**cout<<a<<" / "<<b<<" = "<<div;**

**break;**

**case 5:**

**cout<<a<<" % "<<b<<" = "<<(a%b);**

**break;**

**default:**

**cout<<"ENTERED OPERATION IS INVALID ...!!";**

**}**

**}**

**Output**

**CALCULATOR**

**1 - add**

**2 - substract**

**3 - multiplication**

**4 - division**

**5 - modulas**

**ENTER THE OPERATION => 2**

**NUMBER 1 : 5**

**NUMBER 2 : 6**

**5 - 6 = -1**

1. Write a C++ program to swap two number using call by value mechanism

**programme**

**#include<iostream>**

**using namespace std;**

**void swap(int,int);**

**int main()**

**{**

**int a,b;**

**cout<<"Enter Value Of A :: ";**

**cin>>a;**

**cout<<"\nEnter Value of B :: ";**

**cin>>b;**

**cout<<"\nBefore Swapping, Value of :: \n\tA = "<<a<<"\tB = "<<b<<"\n";**

**swap(a,b);**

**cout<<"\nOutside Function After Swapping, Value of :: \n\tA = "<<a<<"\tB = "<<b<<"\n";**

**}**

**void swap(int a,int b)**

**{**

**int c;**

**c=a;**

**a=b;**

**b=c;**

**cout<<"\nInside Function After Swapping, Value of :: \n\tA = "<<a<<"\tB = "<<b<<"\n";**

**}**

**Output**

**Enter Value Of A :: 23**

**Enter Value of B :: 30**

**Before Swapping, Value of ::**

**A = 23 B = 30**

**Inside Function After Swapping, Value of ::**

**A = 30 B = 23**

**Outside Function After Swapping, Value of ::**

**A = 23 B = 30**

1. Create a class *Vector* with *a single dimensional array*, and *size* as data members. Use friend functions to read and print the member values. Write a main method to demonstrate the *Vector* class.
2. Create a class *Employee* with members *empno , name , deptname* and *designation* as private variables. Create a friend function *List Dept Wise* to list all employees for a given dept.

programme

#include <windows.h>

#include <iostream>

using namespace std;

class employee

{

int emp\_number;

char emp\_name[20];

float emp\_basic;

float emp\_da;

float emp\_it;

float emp\_net\_sal;

public:

void get\_emp\_details();

float find\_net\_salary(float basic, float da, float it);

void show\_emp\_details();

};

void employee :: get\_emp\_details()

{

cout<<"\nEnter employee number: ";

cin>>emp\_number;

cout<<"\nEnter employee name: ";

cin>>emp\_name;

cout<<"\nEnter employee basic: ";

cin>>emp\_basic;

cout<<"\nEnter employee DA: ";

cin>>emp\_da;

cout<<"\nEnter employee IT: ";

cin>>emp\_it;

}

float employee :: find\_net\_salary(float basic, float da, float it)

{

return (basic+da)-it;

}

void employee :: show\_emp\_details()

{

cout<<"\n\n\*\*\*\* Details of Employee \*\*\*\*";

cout<<"\nEmployee Name : "<<emp\_name;

cout<<"\nEmployee number : "<<emp\_number;

cout<<"\nBasic salary : "<<emp\_basic;

cout<<"\nEmployee DA : "<<emp\_da;

cout<<"\nIncome Tax : "<<emp\_it;

cout<<"\nNet Salary : "<<find\_net\_salary(emp\_basic, emp\_da, emp\_it);

cout<<"\n-------------------------------\n\n";

}

int main()

{

employee emp;

emp.get\_emp\_details();

emp.show\_emp\_details();

return 0;

}

**Output**

Enter employee number: 88

Enter employee name: nani

Enter employee basic: 34444

Enter employee DA: 67

Enter employee IT: 66

\*\*\*\* Details of Employee \*\*\*\*

Employee Name : nani

Employee number : 88

Basic salary : 34444

Employee DA : 67

Income Tax : 66

Net Salary : 34445

1. Write a program to find whether the person is eligible for vote or not. And if that particular person is not eligible, then print how many years are left to be eligible. (day 2)

**#include<iostream>**

**using namespace std;**

**int main()**

**{**

**int a;**

**cout<<"ENTER THE AGE => ";**

**cin>>a;**

**if(a>=18)**

**cout<<"\nperson is eligible for voting ";**

**if(a<18)**

**cout<<(18-a)<<" years is left for voting => ";**

**}**

**Output**

**ENTER THE AGE => 13**

**5 years is left for voting =>**

Sample Input:

Enter your age:

7

Sample output:

You are allowed to vote after 11 years

Test cases:

1. 25
2. Eighteen
3. 12
4. -18
5. 34.5
6. Write a program to print Right Triangle Star Pattern(Day 2)

**programme**

**#include <stdio.h>**

**int main()**

**{**

**int n,m=1;**

**printf("Enter the number of rows");**

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

**for(int i=n;i>=1;i--)**

**{**

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

**{**

**printf(" ");**

**}**

**for(int k=1;k<=m;k++)**

**{**

**printf("\*");**

**}**

**printf("\n");**

**m++;**

**}**

**return 0;**

**output**

Sample Input:: n = 5

Output:

\*

\* \*

\* \* \*

\* \* \* \*

\* \* \* \* \*

8. Write a program to convert Decimal number equivalent to Binary number and octal numbers?

**programme**

**#include <iostream>**

**using namespace std;**

**int main()**

**{**

**int dec, bin[16], i = 0, j = 0; //dec and bin to store number and ints binary equivalent and i&j are //for index maintaining**

**cout << "Enter a decimal number\n";**

**cin >> dec;**

**while (dec > 0) //calculating the binary equivalent and storing it in the array**

**{**

**bin[i] = dec % 2;**

**dec = dec / 2;**

**++i;**

**}**

**cout << "Binary Equivalent:"; //printing the array in reverse order**

**for (j = i - 1; j >= 0; --j)**

**cout << bin[j];**

**return 0;**

**}**

**output**

**Enter a decimal number**

**15**

**Binary Equivalent:1111**

Sample Input:

Decimal Number: 15

Sample Output:

Binary Number = 1111

Octal = 17

Test cases:

1. 111
2. 15.2
3. 0
4. B12
5. 1A.2
6. Write a program using function to calculate the simple interest. Suppose the customer is a senior citizen. He is being offered 12 percent rate of interest; for all other customers, the ROI is 10 percent.

**programme**

#include <stdio.h>

int main()

{

float principle, rate, sinterest;

int time;

printf("Enter Principle Amount, Rate %% per Annum and Time\n");

scanf ("%f %f %d", &principle, &rate, &time);

sinterest = (principle \* rate \* time)/ 100.0;

printf ("Principle Amount = %5.2f\n", principle);

printf ("Rate %% per Annum = %5.2f%\n", rate);

printf ("Time = %d years\n", time);

printf ("Simple Interest = %5.2f\n", sinterest);

}

**output**

Sample Input:

Enter the principal amount: 200000

Enter the no of years: 3

Is customer senior citizen (y/n): n

Sample Output:

Interest: 60000

Test Cases:

1. Principal: 2000 , Years: 0
2. Principal: 20000 , Years: -2
3. Principal: -2000 , Years: 2
4. Principal: 2 , Years: 2000
5. Principal: 0 , Years: 5

10. Write a program to print hollow square and full square symbol pattern? Get the different symbol for hollow square and full square as input from the user.

**programme**

#include<stdio.h>

int main(){

int side, i, j;

printf("Enter side of square\n");

scanf("%d", &side);

/\* Row iterator for loop \*/

for(i = 0; i < side; i++){

/\* Column iterator for loop \*/

for(j = 0; j < side; j++){

/\* Check if currely position is a boundary position \*/

if(i==0 || i==side-1 || j==0 || j==side-1)

printf("\*");

else

printf(" ");

}

printf("\n");

}

return 0;

}

Output

Enter side of square

4

\*\*\*\*

\* \*

\* \*

\*\*\*\*

11. [Program to Find Even Sum of Fibonacci Series Till number N](https://www.geeksforgeeks.org/java-program-to-find-sum-of-fibonacci-series-numbers-of-first-n-even-indexes/)?(day 2)

**programme**

**#include <bits/stdc++.h>**

**using namespace std;**

**int calculateEvenSum(int n)**

**{**

**if (n <= 0)**

**return 0;**

**int fibo[2 \* n + 1];**

**fibo[0] = 0, fibo[1] = 1**

**int sum = 0;**

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

**fibo[i] = fibo[i - 1] + fibo[i - 2];**

**if (i % 2 == 0)**

**sum += fibo[i];**

**}**

**return sum;**

**}**

**int main()**

**{**

**// Get n**

**int n = 8;**

**cout << "Even indexed Fibonacci Sum upto "**

**<< n << " terms: "**

**<< calculateEvenSum(n) << endl;**

**return 0;**

**}**

**Output**

Sample Input: n = 4

Sample Output: 33

(N = 4, So here the fibonacci series will be produced from 0th term till 8th term: 0, 1, 1, 2, 3, 5, 8, 13, 21

Sum of numbers at even indexes = 0 + 1 + 3 + 8 + 21 = 33)

12. Write a program to enter the marks of a student in four subjects. Then calculate the total and aggregate, display the grade obtained by the student. If the student scores an aggregate greater than 75%, then the grade is Distinction. If aggregate is 60>= and <75, then the grade is First Division. If aggregate is 50 >= and <60, then the grade is Second Division. If aggregate is 40>= and <50, then the grade is Third Division. Else the grade is Fail.

programme

#include<iostream>

using namespace std;

int main()

{

int english, chemistry, computers, physics, maths;

float total, average, percentage;

cout << "Please Enter the marks of five subjects: \n";

cin >> english >> chemistry >> computers >> physics >> maths;

total = english + chemistry + computers + physics + maths;

average = total / 5;

percentage = (total / (500)) \* 100;

cout << "\nTotal Marks = " << total;

cout << "\nAverage Marks = " << average;

cout << "\nMarks Percentage = " << percentage;

if(percentage >= 90) {

cout << "\nGrade A";

}

else if(percentage >= 80) {

cout << "\nGrade B";

}

else if(percentage >= 70) {

cout << "\nGrade C";

}

else if(percentage >= 60) {

cout << "\nGrade D";

}

else if(percentage >= 40) {

cout << "\nGrade E";

}

else {

cout << "\nFail";

}

return 0;

}

**Output**

Please Enter the marks of five subjects:

78

78

90

89

78

Total Marks = 413

Average Marks = 82.6

Marks Percentage = 82.6

Grade B

Sample Input & Output:

Enter the marks in python: 90

Enter the marks in c programming: 91

Enter the marks in Mathematics: 92

Enter the marks in Physics: 93

Total= 366

Aggregate = 91.5

DISTINCTION

Test cases:

1. 18, 76,93,65
2. 73,78,79,75
3. 98,106,120,95
4. 96,73, -85,95
5. 78,59.8,76,79

13. Write a program for matrix addition?

**programme**

**#include<iostream>**

**using namespace std;**

**int main ()**

**{**

**int m, n, p, q, i, j, A[5][5], B[5][5], C[5][5];**

**cout << "Enter rows and column of matrix A : ";**

**cin >> m >> n;**

**cout << "Enter rows and column of matrix B : ";**

**cin >> p >> q;**

**if ((m != p) && (n != q))**

**{**

**cout << "Matrices cannot be added!";**

**exit(0);**

**}**

**cout << "Enter elements of matrix A : ";**

**for (i = 0; i < m; i++)**

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

**cin >> A[i][j];**

**cout << "Enter elements of matrix B : ";**

**for (i = 0; i < p; i++)**

**for (j = 0; j < q; j++)**

**cin >> B[i][j];**

**for (i = 0; i < m; i++)**

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

**C[i][j] = A[i][j] + B[i][j];**

**cout << "Sum of matrices\n";**

**for (i = 0; i < m; i++)**

**{ for (j = 0; j < n; j++)**

**cout << C[i][j] << " ";**

**cout << "\n";**

**}**

**return 0;**

**}**

**output**

**Enter rows and column of matrix A : 2 2**

**Enter rows and column of matrix B : 2 2**

**Enter elements of matrix A : 4 6**

**2 3**

**Enter elements of matrix B : 7 5**

**2 3**

**Sum of matrices**

**11 11**

**4 6**

Sample Input:

Mat1 = 1 2

5 3

Mat2 = 2 3

4 1

Sample Output:

Mat Sum = 3 5

9 4

14. Write a program for matrix multiplication?

**programme**

**#include <iostream>**

**using namespace std;**

**int main()**

**{**

**int a[10][10],b[10][10],mul[10][10],r,c,i,j,k;**

**cout<<"enter the number of row=";**

**cin>>r;**

**cout<<"enter the number of column=";**

**cin>>c;**

**cout<<"enter the first matrix element=\n";**

**for(i=0;i<r;i++)**

**{**

**for(j=0;j<c;j++)**

**{**

**cin>>a[i][j];**

**}**

**}**

**cout<<"enter the second matrix element=\n";**

**for(i=0;i<r;i++)**

**{**

**for(j=0;j<c;j++)**

**{**

**cin>>b[i][j];**

**}**

**}**

**cout<<"multiply of the matrix=\n";**

**for(i=0;i<r;i++)**

**{**

**for(j=0;j<c;j++)**

**{**

**mul[i][j]=0;**

**for(k=0;k<c;k++)**

**{**

**mul[i][j]+=a[i][k]\*b[k][j];**

**}**

**}**

**}**

**//for printing result**

**for(i=0;i<r;i++)**

**{**

**for(j=0;j<c;j++)**

**{**

**cout<<mul[i][j]<<" ";**

**}**

**cout<<"\n";**

**}**

**return 0;**

**output**

**enter the number of row=2**

**enter the number of column=2**

**enter the first matrix element=**

**2 4**

**2 4**

**enter the second matrix element=**

**3 5**

**3 5**

**multiply of the matrix=**

**18 30**

**18 30**

Sample Input:

Mat1 = 1 2

5 3

Mat2 = 2 3

4 1

Sample Output:

Mat Sum = 10 5

22 18

15. Program to remove duplicates from the sorted array (Day 2)

Sample Input:

Array = {15, 14, 25, 14, 32, 14, 31}

Sample Output:

Sorted Array = {14, 15, 25, 31, 32}

Test cases:

1. {16, 16, 16 16, 16}
2. {0, 0, 0, 0}
3. {-12, -78, -35, -42}
4. {1,2,3,7,8,9,4,5,6}
5. {1-2,2-3,3-4,4-5,5-6}