**Assignment 2 (OOPs)**

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**Q1. To demonstrate conditional operator Write a program to find the bigger of two given numbers.**

#include <iostream>

using namespace std;

int main(){

    int a,b;

    cout<<"Enter first number:  "<<endl;

    cin>>a;

    cout<<"Enter second number: "<<endl;

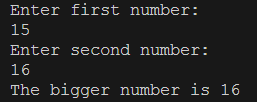
    cin>>b;

    int larger= (a>b)?a:b;

    cout<<"The bigger number is "<<larger<<endl;

    return 0;

}

**Output:  
**

**Q2. Write a Program,In a company if employee’s basic salary is less than or equal to 10,000.Then is DA is 31% of basic salary ,HRA is 12% of basic, MA is Rs.250.If his Salary is greater than 10,000 then DA is 35% of basic, HRA is 15% of basic and MA is 350. Calculate his gross salary.**

#include <iostream>

using namespace std;

int main(){

    float basicSalary;

    cout<<"Enter Basic Salary: "<<endl;

    cin>>basicSalary;

    float DA, HRA, MA;

    if (basicSalary<=10000){

         DA=(0.31)\*basicSalary;

         HRA=(0.12)\*basicSalary;

         MA=250;

    } else {

         DA=(0.35)\*basicSalary;

         HRA=(0.15)\*basicSalary;

         MA=350;

    }

    float gross=DA+HRA+MA+basicSalary;

    cout<<"The Gross Salary will be "<<gross;

    return 0;

}

**Output:**

****

**Q3. Write a program using the nested if-else, to accept monthly salary from the user, find and display income tax with the help of the following rule.**

|  |  |
| --- | --- |
| **Monthly Salary** | **Income Tax** |
| **10,000 or more** | **40% of monthly salary** |
| **7500 to 9999** | **30% of monthly salary** |
| **7499 or less** | **20% of monthly salary** |

#include <iostream>

using namespace std;

int main(){

    float monthly\_salary;

    cout<<"Enter the monthly salary: "<<endl;

    cin>>monthly\_salary;

    float tax=0;

    if (monthly\_salary<10000){

        if (monthly\_salary>7500){

            tax=(0.3)\*monthly\_salary;

        } else {

            tax=(0.2)\*monthly\_salary;

        }

    } else {

        tax=(0.4)\*monthly\_salary;

    }

    cout<<"The Income Tax will be: "<<tax<<endl;

    return 0;

}

**Output:**

****

**Q4. Write a program that calculates the sum of first n natural numbers using do-while loop.**

#include <iostream>

using namespace std;

int main() {

    int n;

    int i = 0;

    int sum = 0;

    cout << "Enter the number: " << endl;

    cin >> n;

    do {

        i++;

        sum += i;

    } while (i < n);

    cout << "The Sum of the first " << n << " natural numbers is: " << sum << endl;

    return 0;

}

**Output:**

****

**Q5. Write a program to find and print the n terms of Fibonnaci Numbers.**

#include <iostream>

using namespace std;

int fibonnaciNums(int *n*){

    if (n==1 || n==2){

        return 1;

    } else {

        return fibonnaciNums(n-1)+fibonnaciNums(n-2);

    }

}

int main(){

    int n;

    cout<<"Enter the number: "<<endl;

    cin>>n;

    cout<<"The "<<n<<"th fibonnaci number will be: "<<fibonnaciNums(n)<<endl;

    return 0;

}

**Output:**

****

**Q6. Write a program to calculate the sum of three given numbers by using a function.**

#include <iostream>

using namespace std;

int summer(int a, int b, int c){

    int sum=a+b+c;

    return sum;

}

int main(){

    int a, b, c;

    cout<<"Enter the first number: "<<endl;

    cin>>a;

    cout<<"Enter the second number: "<<endl;

    cin>>b;

    cout<<"Enter the third number: "<<endl;

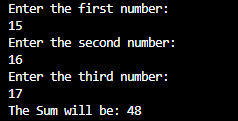
    cin>>c;

    cout<<"The Sum will be: "<<summer(a,b,c);

    return 0;

}

**Output:**

****

**Q7. Write a program to calculate factorial of a given integers number by call by value function.**

#include <iostream>

using namespace std;

int factorialNumber(int *n*){

    if (n<=1){

        return 1;

    } else {

        return n\*factorial(n-1);

    }

}

int main(){

    int number;

    cout<<"Enter the number: "<<endl;

    cin>>number;

    int result=factorialNumber(number);

    cout<<"The Factorial of "<<number<<" is "<<result<<endl;

    return 0;

}

**Output:  
**

**Q8. Write a program to exchange the contents of two variables by using call by reference method.**

#include <iostream>

using namespace std;

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

    int temp=a;

    a=b;

    b=temp;

}

int main(){

    int a, b;

    cout<<"Enter the first number: ";

    cin>>a;

    cout<<"Enter the second number: ";

    cin>>b;

    cout<<"Before Swapping: first number="<<a<<", second number="<<b<<endl;

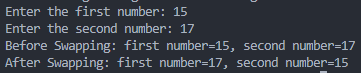
    swap(a,b);

    cout<<"After Swapping: first number="<<a<<", second number="<<b<<endl;

    return 0;

}

**Output:**

****

**Q9. Write a program using the Class and object. Create a Student class with attributes like name, roll number, and marks. Implement methods to calculate the grade based on the marks.**

#include <iostream>

#include <string>

using namespace std;

class Student {

private:

    string name;

    int rollNum;

    float marks;

public:

    Student() : name(""), rollNum(0), marks(0.0) {}

    Student(string *n*, int *r*, float *m*) : name(n), rollNum(r), marks(m) {}

    void inputDetails() {

        cout << "Enter name of the student: ";

        getline(cin, name);

        cout << "Enter the roll number of the student: ";

        cin >> rollNum;

        cout << "Enter the marks of the student: ";

        cin >> marks;

        cin.ignore();

    }

    char calculatedGrade() const {

        if (marks >= 85) return 'A';

        else if (marks >= 70) return 'B';

        else if (marks >= 55) return 'C';

        else if (marks >= 40) return 'D';

        else return 'F';

    }

    void display() const {

        cout << "Name: " << name << endl;

        cout << "Roll Number: " << rollNum << endl;

        cout << "Marks: " << marks << endl;

        cout << "Grade: " << calculatedGrade() << endl;

    }

};

int main() {

    Student student;

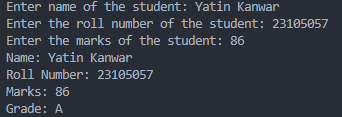
    student.inputDetails();

    student.display();

    return 0;

}

**Output:**

****

**Q10. Write a program using the Class and object Develop a Car class that contains attributes like make, model, year, and speed. Include methods like accelerate and brake.**

#include <iostream>

#include <string>

#include <algorithm>

using namespace std;

class Car {

private:

    string make;

    string model;

    int year;

    int speed;

public:

    Car(string *mmake* = "", string *mmodel* = "", int *yyear* = 0, int *sspeed* = 0)

        : make(mmake), model(mmodel), year(yyear), speed(sspeed) {}

    void inputDetails() {

        cout << "Enter the make of the car: ";

        getline(cin, make);

        cout << "Enter the model of the car: ";

        getline(cin, model);

        cout << "Enter the year of manufacture: ";

        cin >> year;

        cout << "Enter the initial speed of the car: ";

        cin >> speed;

        cin.ignore();

    }

    void displayInfo() const {

        cout << "Make: " << make << endl

             << "Model: " << model << endl

             << "Year: " << year << endl

             << "Speed: " << speed << " km/h" << endl;

    }

    void accelerate(int *increment*) {

        speed += increment;

        cout << "Accelerated to " << speed << " km/h" << endl;

    }

    void brake(int *decrement*) {

        speed = max(0, speed - decrement);

        cout << "Slowed down to " << speed << " km/h" << endl;

    }

};

int main() {

    Car car;

    car.inputDetails();

    car.displayInfo();

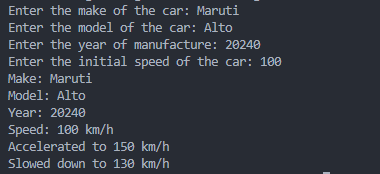
    car.accelerate(50);

    car.brake(20);

    return 0;

}

**Output:**

****

**Q11. Design a Polygon class with attributes for the number of sides and length of each side. Implement methods to calculate the perimeter and area.**

#include <iostream>

#include <cmath>

using namespace std;

class Polygon {

private:

    int numSides;

    float sideLength;

public:

    Polygon(int *sides* = 0, float *length* = 0.0) : numSides(sides), sideLength(length) {}

    void inputDetails() {

        cout << "Enter the number of sides of the polygon: ";

        cin >> numSides;

        cout << "Enter the length of each side of the polygon: ";

        cin >> sideLength;

    }

    float perimeter() const {

        return numSides \* sideLength;

    }

    float area() const {

        if (numSides < 3) return 0;

        return (numSides \* sideLength \* sideLength) / (4 \* tan(M\_PI / numSides));

    }

    void displayInfo() const {

        cout << "Number of sides: " << numSides << endl

             << "Length of each side: " << sideLength << endl

             << "Perimeter: " << perimeter() << endl

             << "Area: " << area() << endl;

    }

};

int main() {

    Polygon polygon;

    polygon.inputDetails();

    polygon.displayInfo();

    return 0;

}

**Output:**

