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1. (i)

// Program to find sum and product of the last two digits of a number.

#include <iostream>

using namespace std;

int main(){

int a, b, c, d, e, f;

cout<<"Enter a number : ";

cin>>a;

b = a % 10;

c = a / 10;

d = c % 10;

e = b + d;

f = b \* d;

cout<<"Sum of last two digits : "<<e<<endl;

cout<<"Product of last two digits : "<<f<<endl;

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 5 | 5 , 0 | 5 , 0 |
| 12 | 3 , 2 | 3 , 2 |
| 124 | 6 , 8 | 6 , 8 |
| 5678 | 15 , 56 | 15 , 56 |

(ii)

// Program to reverse a 3-digit number.

#include <iostream>

using namespace std;

int main()

{

int a, b;

cout<<"Enter a 3-digit number : ";

cin>>a;

if(a<100 || a>999){

cout<<"Invalid number. Enter a valid 3-digit number "<<endl;

return 0;

}

while(a!=0){

b = b \* 10 + a % 10;

a = a / 10;

}

cout<<"Reversed Digit : "<<b;

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 23 | Invalid number | Invalid number |
| 231 | 132 | 132 |
| 345 | 543 | 543 |
| 2356 | Invalid number | Invalid number |

2. (i)

// Program to reverse a number and check if it's a palindrome or not.

#include <iostream>

using namespace std;

int reverse(int a){

int rev = 0;

while(a!=0){

rev = rev \* 10 + a % 10;

a = a / 10;

}

cout<<"Reversed Digit : "<<rev<<endl;

}

int ispalindrome(int a){

int rev;

if(rev == a){

cout<<"Entered number is a palindrome "<<endl;

}

else{

cout<<"Not a palindrome"<<endl;

}

}

int main() {

int a;

cout<<"Enter a number : ";

cin>>a;

reverse(a);

ispalindrome(a);

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 231 | 132 , Not a Palindrome | 132 , Not a Palindrome |
| 3425 | 5243 , Not a Palindrome | 5243 , Not a Palindrome |
| 212 | 212 , Palindrome | 212 , Palindrome |
| 3553 | 3553 , Palindrome | 3553 , Palindrome |

(ii)

#include <iostream>

using namespace std;

// Radians to Degrees

int angle(float r, float d){

const double pi = 3.14159265358979323846;

r = d \* (pi / 180);

cout<<"Angle in radian : "<<r<<endl;

cout<<endl;

}

// Fahrenheit to Celsius

int temp1(float f, float c){

c = (f - 32) \* 5 / 9;

cout<<"Temperature in Celsius : "<<c<<endl<<endl;

}

// Celsius to Fahrenheit

int temp2(float f, float c){

f = (c \* 9 / 5) + 32;

cout<<"Temperature in Fahrenheit : "<<f<<endl<<endl;

}

// Inches measure into foot, centimeter, yard and meter.

int distance(int inches){

double feet, centimeters, yards, meters;

feet = inches / 12;

centimeters = inches \* 2.54;

yards = inches / 36;

meters = inches \* 0.0254;

cout << "The length in feet is " << feet << endl;

cout << "The length in centimeters is " << centimeters << endl;

cout << "The length in yards is " << yards << endl;

cout << "The length in meters is " << meters << endl;

}

int main(){

int r,d;

cout<<"Angle in degree : ";

cin>>d;

angle(r,d);

int c,f;

cout<<"Enter temperature in Fahrenheit : ";

cin>>f;

temp1(f,c);

cout<<"Enter temperature in Celsius : ";

cin>>c;

temp2(f,c);

int inches;

cout<<"Enter distance in Inches : ";

cin>>inches;

distance(inches);

return 0;

}

**Radians to Degrees**

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 345 | 6.02139 | 6.02139 |
| 90 | 1.5708 | 1.5708 |
| 1024 | 17.8722 | 17.8722 |
| 2556 | 44.6106 | 44.6106 |

**Fahrenheit to Celsius**

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 67 | 19.4444 | 19.4444 |
| 126 | 52.2222 | 52.2222 |
| 276 | 135.556 | 135.556 |
| 563 | 295 | 295 |

**Celsius to Fahrenheit**

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 32 | 89.6 | 89.6 |
| 67 | 152.6 | 152.6 |
| 142 | 287.6 | 287.6 |
| 231 | 447.8 | 447.8 |

**Inches measure into feet, centimeters, yards and meters.**

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 48 | 4 , 121.92 , 1 , 1.2192 | 4 , 121.92 , 1 , 1.2192 |
| 84 | 7 , 213.6 , 2 , 2.1336 | 7 , 213.6 , 2 , 2.1336 |
| 118 | 9 , 299.72 , 3 , 2.9972 | 9 , 299.72 , 3 , 2.9972 |
| 243 | 20 , 617.22 , 6 , 6.1722 | 20 , 617.22 , 6 , 6.1722 |

(iii)

// Roots of a quadratic equation

#include <iostream>

#include <cmath>

using namespace std;

int main(){

float a, b, c, d, r, r1, r2;

cout<<"Value of a : ";

cin>>a;

cout<<"Value of b : ";

cin>>b;

cout<<"Value of c : ";

cin>>c;

cout<<"Quadratic equation : "<<a<<"x^2 + "<<b<<"x + "<<c<<endl;

d = b\*b - 4\*a\*c;

if(a==0 && b==0){

cout<<"No solution"<<endl;

}

else if(a==0){

r = -(c / a);

cout<<"One root : "<<r<<endl;

}

else if(d<0){

cout<<"No real roots";

}

else{

r1 = -b + sqrt(d) / (2\*a);

r2 = -b - sqrt(d) / (2\*a);

cout<<"First root : "<<r1<<endl;

cout<<"Second root : "<<r2<<endl;

}

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 0 , 0 , 5 | No solution | No solution |
| 0 , 2 , 3 | One solution = -inf | One solution = -inf |
| 1 , 0 , 4 | No real solution | No real solution |
| 1 , -8 , 15 | Real roots = 5 ,3 | Real roots = 5 ,3 |
| 1 , 2 , 1 | One solution = -1 | One solution = -1 |

(iv)

// Display of a Student’s grades

#include <iostream>

using namespace std;

int main(){

float a, b, c, avg, avg1;

cout<<"Enter marks of Test-1 out of 100 : ";

cin>>a;

if(a<0 || a>100){

cout<<"Invalid valid marks. Enter valid marks."<<endl;

return 0;

}

cout<<"Enter marks of Test-2 out of 100 : ";

cin>>b;

if(b<0 || b>100){

cout<<"Invalid valid marks. Enter valid marks."<<endl;

return 0;

}

cout<<"Enter marks of Test-3 out of 100 : ";

cin>>c;

if(c<0 || c>100){

cout<<"Invalid valid marks. Enter valid marks."<<endl;

return 0;

}

avg1 = ((b + c) / 200) \* 100;

avg = ((a + b + c) / 300) \* 100;

cout<<"Average marks : "<<avg<<"%"<<endl;

if(avg>=90){

cout<<"Grade A";

}

else if(avg>=70 && avg<90){

cout<<"Checking 3rd Score"<<endl;

if(c>=90){

cout<<"Grade A"<<endl;

}

else{

cout<<"Grade B"<<endl;

}

}

else if(avg>=50 && avg<70){

if(avg1>70){

cout<<"Grade C"<<endl;

}

else{

cout<<"Grade D"<<endl;

}

}

else{

cout<<"Grade F"<<endl;

}

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 89 , 92 , 93 | Grade A | Grade A |
| 88 , 82 , 87 | Grade B | Grade B |
| 62 , 76 , 71 | Grade C | Grade C |
| 67 , 71 , 65 | Grade D | Grade D |
| 56 , 42 , 47 | Grade F | Grade F |
| 122 , 73 , 84 | Invalid Marks | Invalid Marks |

3.

// Electricity unit charges

#include <iostream>

using namespace std;

int main(){

double units, total, charges, surcharge;

cout<<"Enter the elecricity units used : ";

cin>>units;

if(units <= 50){

charges = 0.50 \* units;

}

else if(units>50 && units<=150){

charges = 25 + 0.75 \* (units - 50);

}

else if(units>150 && units<=250){

charges = 100 + 1.20 \* (units - 150);

}

else{

charges = 220 + 1.50 \* (units - 250);

}

surcharge = charges + 0.2 \* charges ;

cout<<"Total charges : Rs "<<surcharge<<endl;

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 45 | Rs 27 | Rs 27 |
| 137 | Rs 108.3 | Rs 108.3 |
| 182 | Rs 166.08 | Rs 166.08 |
| 256 | Rs 276.6 | Rs 276.6 |

4.

#include <iostream>

using namespace std;

int main(){

int num1 , num2 ;

cout<<"Enter First number : ";

cin>>num1;

cout<<"Enter Second number : ";

cin>>num2;

if(num1 == num2){

cout<<"Both numbers are equal"<<endl;

}

else if(num1>num2){

cout<<"First number is greater than Second number"<<endl;

}

else{

cout<<"Second number is greater than First number";

}

return 0;

}

| **Input** | **Expected Output** | **My Output** |
| --- | --- | --- |
| 15 , 12 | First number is greater | First number is greater |
| 54 , 87 | Second number is greater | Second number is greater |
| 67 , 67 | Both numbers are equal | Both numbers are equal |

5.

#include <iostream>

using namespace std;

int main(){

int num;

cout<<"Enter a number : ";

cin>>num;

if((num%2) == 0){

cout<<num<<" is an even number"<<endl;

}

else{

cout<<num<<" is an odd number"<<endl;

}

return 0;

}

| **Insert** | **Expected output** | **My output** |
| --- | --- | --- |
| 23 | Odd number | Odd number |
| 56 | Even number | Even number |

6.

#include<iostream>

using namespace std;

int main(){

int year;

cout<<"Enter year : ";

cin>>year;

if (year%400==0)

cout<<year<<" is a leap year";

else if(year%100==0)

cout<<year<<" is not a leap year";

else if (year%4==0)

cout<<year<<" is a leap year";

else

cout<<year<<" is not a leap year";

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 1800 | Not a leap year | Not a leap year |
| 1799 | Not a leap year | Not a leap year |
| 2016 | Leap year | Leap year |
| 2015 | Not a Leap year | Not a Leap year |
| 1956 | Leap year | Leap year |
| 1978 | Not a Leap year | Not a Leap year |

7.

// Checking a character is an alphabet or not

#include <iostream>

using namespace std;

int main(){

char c;

cout<<"Enter a character : ";

cin>>c;

if((c >= 'a' && c <= 'z') || (c >= 'A' && c <= 'Z')){

cout<<"Entered Character is an alphabet"<<endl;

}

else{

cout<<"Not an alphabet";

}

return 0;

}

| **Input** | **Expected Output** | **My output** |
| --- | --- | --- |
| Vinay | Alphabet | Alphabet |
| @ | Not a Alphabet | Not a Alphabet |
| 34 | Not a Alphabet | Not a Alphabet |

8.

//To check a character is vowel or consonant

#include <iostream>

using namespace std;

int main(){

char c;

cout<<"Enter a alphabet : ";

cin>>c;

if((c >= 'a' && c <= 'z') || (c >= 'A' && c <= 'Z')){

if(c == 'a' || c == 'e' || c == 'i' || c == 'o' ||c == 'u' || c == 'A' || c == 'E' || c == 'I' || c == 'O' || c == 'U'){

cout<<"The character is a vowel";

}

else {

cout<<"Not a vowel";

}

}

else{

cout<<"Not a Alphabet";

}

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| a | Vowel | Vowel |
| x | Not a Vowel | Not a Vowel |
| H | Not a Vowel | Not a Vowel |
| O | Vowel | Vowel |
| 67 | Not a alphabet | Not a alphabet |

9.

#include <iostream>

using namespace std;

int main() {

char x;

cout << "Enter a character: ";

cin >> x;

if (x >= 'A' && x <= 'Z' || x >= 'a' && x <= 'z') {

cout <<x<< " is an alphabet" << endl;

}

else if (x >= '0' && x <= '9') {

cout <<x<< " is a digit" << endl;

}

else {

cout <<x<< " is a special character" << endl;

}

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 5 | Digit | Digit |
| A | Alphabet | Alphabet |
| @ | Special Character | Special Character |

10.

#include <iostream>

using namespace std;

int main(){

char a;

cout<<"Enter a character : ";

cin>>a;

if(a>='A' && a<='Z'){

cout<<"It is an uppercase character"<<endl;

}

else if(a>='a' && a<='z'){

cout<<"It is a lowercase character"<<endl;

}

else{

cout<<"Invalid Character. Enter a valid character.";

}

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| a | Lowercase character | Lowercase character |
| V | Uppercase character | Uppercase character |
| 4 | Invalid character | Invalid character |
| $ | Invalid character | Invalid character |

11.

#include <iostream>

using namespace std;

int main(){

int a;

cout<<"Enter a Week number : ";

cin>>a;

switch(a){

case 1:

cout<<"Sunday";

break;

case 2:

cout<<"Monday";

break;

case 3:

cout<<"Tuesday";

break;

case 4:

cout<<"Wednesday";

break;

case 5:

cout<<"Thrusday";

break;

case 6:

cout<<"Friday";

break;

case 7:

cout<<"Saturday";

break;

default:

cout<<"Invalid input";

break;

}

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 2 | Monday | Monday |
| 7 | Saturday | Saturday |
| 0 | Invalid input | Invalid input |
| 9 | Invalid input | Invalid input |

12.

#include <iostream>

using namespace std;

int main(){

int a;

cout<<"Enter Month number(1-12) : ";

cin>>a;

switch(a){

case 1:

cout<<"31 Days"<<endl;

break;

case 3:

cout<<"31 Days"<<endl;

break;

case 5:

cout<<"31 Days"<<endl;

break;

case 7:

cout<<"31 Days"<<endl;

break;

case 8:

cout<<"31 Days"<<endl;

break;

case 10:

cout<<"31 Days"<<endl;

break;

case 12:

cout<<"31 Days"<<endl;

break;

case 4:

cout<<"30 Days"<<endl;

break;

case 6:

cout<<"30 Days"<<endl;

break;

case 9:

cout<<"30 Days"<<endl;

break;

case 11:

cout<<"30 Days"<<endl;

break;

case 2:

cout<<"28 or 29 Days"<<endl;

break;

default:

cout<<"Invalid input";

break;

}

return 0;

}

| **Input** | **Expected output** | **My output** |
| --- | --- | --- |
| 6 | 30 Days | 30 Days |
| 12 | 31 Days | 31 Days |
| 2 | 28 or 29 Days | 28 or 29 Days |
| 15 | Invalid input | Invalid input |