**//……4.Program in C++ implementing a calculator**

#include<bits/stdc++.h> **//universal header file**

using namespace std;

class calculator

{ int x,y;

public: **//public class members**

int add();

int sub();

int mul();

double div();

double sine();

double cosine();

double tangent();

double lg();

int mod();

int sq();

double sqrtn();

int power();

double root();

};

int calculator::add() **//addition function**

{ cout<<"Enter the two values:"<<endl;

cin>>x>>y;

return (x+y); }

int calculator::sub() **//subtraction function**

{ cout<<"Enter the two values:"<<endl;

cin>>x>>y;

return (x-y); }

int calculator::mul() **//multiplication function**

{ cout<<"Enter the two values:"<<endl;

cin>>x>>y;

return (x\*y); }

double calculator::div() **//division function**

{ cout<<"Enter the two values:"<<endl;

cin>>x>>y;

return (x/y); }

double calculator::sine() **//sine function**

{ cout<<"Enter the angle:"<<endl;

cin>>x;

return sin(x); }

double calculator::cosine() **//cosine function**

{ cout<<"Enter the angle:"<<endl;

cin>>x;

return cos(x); }

double calculator::tangent() **//tangent function**

{ cout<<"Enter the angle:"<<endl;

cin>>x;

return tan(x); }

double calculator::lg() **//logarithm function**

{ cout<<"Enter the value:"<<endl;

cin>>x;

return log(x); }

int calculator::mod() **//modulus function**

{ cout<<"Enter the values:"<<endl;

cin>>x>>y;

return fmod(x,y); }

int calculator::sq() **//square function**

{ cout<<"Enter the value:"<<endl;

cin>>x;

return (pow(x,2)); }

double calculator::sqrtn() **//square root function**

{ cout<<"Enter the value:"<<endl;

cin>>x;

return (sqrt(x)); }

int calculator::power() **//power function**

{ cout<<"Enter the values:"<<endl;

cin>>x>>y;

return pow(x,y); }

double calculator::root() **//root function**

{ cout<<"Enter the values:"<<endl;

cin>>x>>y;

return pow(x,1/y); }

**//MAIN FUNCTION**

int main()

{ calculator c; **//object c of calculator class**

int res;

double r;

int ch;

cout<<"SELECT THE OPTION FROM THE MENU TO IMPLEMENT OPERATION IN CALCULATOR"<<endl; **//CALCULATOR MENU**

cout<<"1.Addition"<<endl;

cout<<"2.Subtraction"<<endl;

cout<<"3.Multiplication"<<endl;

cout<<"4.Division"<<endl;

cout<<"5.Sine"<<endl;

cout<<"6.Cosine"<<endl;

cout<<"7.Tangent"<<endl;

cout<<"8.Logarithm"<<endl;

cout<<"9.Modulus"<<endl;

cout<<"10.Square"<<endl;

cout<<"11.Square root"<<endl;

cout<<"12.Power"<<endl;

cout<<"13.nth Root"<<endl;

cin>>ch;

switch(ch) **//Switch Operator**

{ case 1:

res=c.add();

cout<<"THE ANSWER IS:"<<res<<endl;

break;

case 2:

res=c.sub();

cout<<"THE ANSWER IS:"<<res<<endl;

break;

case 3:

res=c.mul();

cout<<"THE ANSWER IS:"<<res<<endl;

break;

case 4:

r=c.div();

cout<<"THE ANSWER IS:"<<r<<endl;

break;

case 5:

r=c.sine();

cout<<"THE ANSWER IS:"<<r<<endl;

break;

case 6:

r=c.cosine();

cout<<"THE ANSWER IS:"<<r<<endl;

break;

case 7:

r=c.tangent();

cout<<"THE ANSWER IS:"<<r<<endl;

break;

case 8:

r=c.lg();

cout<<"THE ANSWER IS:"<<r<<endl;

break;

case 9:

res=c.mod();

cout<<"THE ANSWER IS:"<<res<<endl;

break;

case 10:

res=c.sq();

cout<<"THE ANSWER IS:"<<res<<endl;

break;

case 11:

r=c.sqrtn();

cout<<"THE ANSWER IS:"<<r<<endl;

break;

case 12:

res=c.power();

cout<<"THE ANSWER IS:"<<res<<endl;

break;

case 13:

r=c.root();

cout<<"THE ANSWER IS:"<<r<<endl;

break;

default: **//default case**

cout<<"INVALID CHOICE "<<endl;

}

return 0;

}

**OUTPUT**

**/\*...5.Class in C++ to sort nos. in ascending/descending**

**using Bubble sort \*/**

#include<bits/stdc++.h> **//universal header file**

using namespace std;

class sorting {

int n,i,j,temp;

int a[100];

public: **//public class members**

void get();

void sort();

void put();

};

void sorting::get() **//function that input nos.**

{ cout<<"Enter how many nos. are there to sort:"<<endl;

cin>>n;

cout<<"Enter the nos.:"<<endl;

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

cin>>a[i]; **//inputing nos.**

}

void sorting::sort() **//function that performs sorting**

{ int ch;

cout<<"Enter the sort to perform\n1.Ascending\n2.Descending"<<"\n";

cin>>ch;

switch(ch)

{

case 1:

for(i=0;i<n;i++) **//Ascending order**

{

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

{

if(a[i]>a[j])

{

temp=a[i];

a[i]=a[j];

a[j]=temp;

}} }

break;

case 2:  **//Descending order**

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

{ for(j=i+1;j<n;j++)

{ if(a[i]<a[j])

{

temp=a[i];

a[i]=a[j];

a[j]=temp;

} } }

break;

default: **//default case**

cout<<"INCORRECT CHOICE"<<endl;

}}

void sorting::put() **//function that gives sorted array as output**

{

cout<<"ARRAY AFTER SORTING:"<<endl;

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

cout<<a[i]<<" ";

}

**//MAIN FUNCTION**

int main()

{

sorting o; **//object of class sorting**

o.get();

o.sort();

o.put();

return 0;

}

**OUTPUT**

**//…6.Class to convert a string to characters or vice versa**

#include<bits/stdc++.h> **//universal header file**

using namespace std;

class convert{

char st[100],ch;

int i,n;

public:

void strtoch();

void chtostr();

};

void convert::strtoch() **//string to character convertor function**

{

cout<<"Enter the string:";

cin>>st;

n=strlen(st); **//function that calculates length of string**

cout<<"The characters are:"<<endl;

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

{

cout<<st[i]<<endl;

}}

void convert::chtostr() **//character to string convertor function**

{

cout<<"Enter the no. of charachters:";

cin>>n;

cout<<"Enter the characters:";

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

{ cin>>ch;

st[i]=ch;

}

cout<<st; }

**//MAIN FUNCTION**

int main()

{ int ch;

convert s;

cout<<"Enter the choice of operation\n1-String to Charachter\n2-Charachter to String\n";

cin>>ch;

switch(ch) **//Switch operator**

{

case 1:

s.strtoch();

break;

case 2:

s.chtostr();

break;

default:

cout<<"WRONG CHOICE"<<endl; }

return 0;

}

**OUTPUT**

**//…7.Class implementing a tictactoe game**

#include<bits/stdc++.h> **//universal header file**

using namespace std;

class tictactoe **//class**

{ char a[3][3];

char ch;

int p,q;

char p1,p2;

public: **//public class members**

int get\_input();

void start();

int check();

void display();

};

int tictactoe::get\_input() **//get\_input function to accept place coordinates**

{

start();

for(int i=0;i<9;i++)

{ if(i%2==0)

{ cout<<"\n Player 1, Enter the place cordinates: ";

cin>>p>>q;

a[p-1][q-1]=p1;

display();

if(i>3)

if(check())

return 1; }

else

{ cout<<"\n Player 2, Enter the place cordinates: ";

cin>>p>>q;

a[p-1][q-1]=p2;

display();

if(i>3)

if(check())

return 2;

}}

return 0; }

void tictactoe::start() **//start function to accept the character to start with**

{ cout<<"Player 1, Enter the character you want(0/X) : ";

cin>>p1;

if(p1=='X' || p1=='x')

p2='0';

else

p2='X';

for(int i=0;i<3;i++)

for(int j=0;j<3;j++)

a[i][j]=' '; }

int tictactoe::check() **//check function to check various conditions**

{ for(int i=0;i<3;i++)

if(a[i][0]==a[i][1] && a[i][1]==a[i][2] &&a[i][0]!=' ')

return 1;

for(int i=0;i<3;i++)

if(a[0][i]==a[1][i] && a[1][i]==a[2][i] &&a[0][i]!=' ')

return 1;

if(a[0][0]==a[1][1] && a[1][1]==a[2][2] &&a[0][0]!=' ')

return 1;

if(a[0][2]==a[1][1] && a[1][1]==a[2][0]&&a[0][2]!=' ')

return 1;

return 0; }

void tictactoe::display() **//display functions displays the game**

{ for(int i=0;i<3;i++)

{ cout<<"\n";

for(int j=0;j<3;j++)

cout<<a[i][j]<<" | ";

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

**//MAIN FUNCTION**

int main()

{ tictactoe game; **//class tictactoe's object game**

cout<<"-------------The Tic-Tac-Toe Game-----------\n";

int result=game.get\_input();

if(result==1)

cout<<"\n Player 1 wins !\n";

else if(result==2)

cout<<"\n Player 2 wins !\n";

else

cout<<"\n Draw Match !\n";

return 0; }

**OUTPUT**

**//….8.Calculator in Java**

import java.util.\*;

public class Calculator

{ public static void main(String args[])

{ Scanner sc=new Scanner(System.in); **//Scanner class object sc**

int a,b,choice;

System.out.println("SELECT THE OPERATION YOU WANT TO PERFORM:");

System.out.println("1.ADDITION");

System.out.println("2.SUBSTRACTION");

System.out.println("3.MULTIPLICATION");

System.out.println("4.DIVISON");

choice=sc.nextInt();

System.out.println("Enter two numbers");

a=sc.nextInt();

b=sc.nextInt();

switch(choice) **//Switch operator**

{ case 1:System.out.println("ADDITION IS: "+(a+b));

break;

case 2:System.out.println("SUBSTRACTION IS: "+(a-b));

break;

case 3:System.out.println("MULTIPLICATION IS: "+(a\*b));

break;

case 4:System.out.println("DIVISON IS: "+(a/b));

break;

default: **//default case**

System.out.println("INCORRECT CHOICE"); }}}

**OUTPUT**

**//…9.Binary search in Java**

import java.util.\*;

public class bsearch {

public static void main(String args[])

{

int i,j,m,n,a[],lb=0,ub,s,f=0; **//variables**

Scanner ob=new Scanner(System.in);

System.out.println("Enter the array size:");

n=ob.nextInt();

ub=n;

a = new int [n]; **//array a**

System.out.println("Enter nos. in array:");

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

a[i]=ob.nextInt();

System.out.println("Enter no. to search:");

s=ob.nextInt();

while(lb<=ub) **//condition**

{m=(lb+ub)/2;

if(m==s)

{f=1;

break;}

else if(s<m)

ub=m-1;

else

lb=m+1;

}

if(f==1) **//flag f**

System.out.println("SEARCH SUCCESSFUL");

else

System.out.println("SEARCH UNSUCCESSFUL");

}}

**OUTPUT**

**//…10.Palindrome in Java**

import java.util.\*;

import java.lang.\*;

public class Palindrome {

public static void main(String args[])

{ String a,b; **// String a & b**

int n,m=0,r,ch;

Scanner in=new Scanner(System.in);

System.out.println("Enter your choice:");

System.out.println("1.PALINDROME OF A NO. 2.PALINDROME OF A STRING");

ch=in.nextInt();

switch(ch) **// switch operator**

{ case 1:

System.out.println("Enter the number:");

n=in.nextInt();

while(n!=0)

{ r=n%10;

m=m\*10+r;

n=n/10; }

if(m==n)

System.out.println("Number is Palindrome");

else

System.out.println("Number is not Palindrome");

break; **//break function**

case 2:

System.out.println("Enter the String:");

a=in.next();

b = new StringBuffer(a).reverse().toString();

if(b.compareToIgnoreCase(a)==0)

System.out.println("String is Palindrome");

else

System.out.println("String is not Palindrome");

break;

default: **//default case**

System.out.println("WRONG CHOICE");

} } }

**OUTPUT**

**//…11.C++ Program to implement Circular Linked List**

#include<bits/stdc++.h> **//universal header file**

using namespace std;

struct node **//self referential structure**

{ int info;

struct node \*next;

}\*last;

class circular\_list

{

public: **//public members**

void create\_node(int value);

void add\_begin(int value);

void add\_after(int value, int position);

void delete\_element(int value);

void display\_list();

circular\_list()

{

last = NULL;

}

};

**//MAIN FUNCTION**

int main()

{

int choice, element, position;

circular\_list cl;

cout<<"Circular linked list"<<endl;

cout<<"---------------------------"<<endl;

cout<<"1.Create Node"<<endl;

cout<<"2.Add at beginning"<<endl;

cout<<"3.Add after"<<endl;

cout<<"4.Delete"<<endl;

cout<<"5.Display"<<endl;

cout<<"6.Quit"<<endl;

while (1)

{ cout<<"Enter your choice : ";

cin>>choice;

switch(choice) **//switch operator**

{ case 1:

cout<<"Enter the element: ";

cin>>element;

cl.create\_node(element);

cout<<endl;

break;

case 2:

cout<<"Enter the element: ";

cin>>element;

cl.add\_begin(element);

cout<<endl;

break;

case 3:

cout<<"Enter the element: ";

cin>>element;

cout<<"Insert element after position: ";

cin>>position;

cl.add\_after(element, position);

cout<<endl;

break;

case 4:

if (last == NULL)

{ cout<<"List is empty, nothing to delete"<<endl;

break;}

cout<<"Enter the element for deletion: ";

cin>>element;

cl.delete\_element(element);

cout<<endl;

break;

case 5:

cl.display\_list();

break;

case 6:

exit(1);

break;

default:

cout<<"Wrong choice"<<endl;}}

return 0;}

void circular\_list::create\_node(int value) **//function to create node**

{ struct node \*temp;

temp = new(struct node);

temp->info = value;

if (last == NULL)

{ last = temp;

temp->next = last;

}

else

{ temp->next = last->next;

last->next = temp;

last = temp;

}}

void circular\_list::add\_begin(int value) **//function to add a node at the beginning of linked list**

{ if (last == NULL)

{ cout<<"First Create the list."<<endl;

return;}

struct node \*temp;

temp = new(struct node);

temp->info = value;

temp->next = last->next;

last->next = temp;}

void circular\_list::add\_after(int value, int pos) **//function to add a node at the end**

{ if (last == NULL)

{ cout<<"First Create the list."<<endl;

return; }

struct node \*temp, \*s;

s = last->next;

for (int i = 0;i < pos-1;i++)

{ s = s->next;

if (s == last->next)

{ cout<<"There are less than ";

cout<<pos<<" in the list"<<endl;

return;

} }

temp = new(struct node);

temp->next = s->next;

temp->info = value;

s->next = temp;

if (s == last) **//Element inserted at the end**

{ last=temp; }}

void circular\_list::delete\_element(int value) **//function to delete a node**

{ struct node \*temp, \*s;

s = last->next;

if (last->next == last && last->info == value) **//If List has only one element**

{ temp = last;

last = NULL;

free(temp);

return;

}

if (s->info == value) **//First Element Deletion**

{ temp = s;

last->next = s->next;

free(temp);

return;

}

while (s->next != last)

{ if (s->next->info == value) **//Deletion of Element in between**

{ temp = s->next;

s->next = temp->next;

free(temp);

cout<<"Element "<<value;

cout<<" deleted from the list"<<endl;

return;

} s = s->next; }

if (s->next->info == value) **//Deletion of last element**

{ temp = s->next;

s->next = last->next;

free(temp);

last = s;

return; }

cout<<"Element "<<value<<" not found in the list"<<endl;}

void circular\_list::display\_list() **//Function to display circular linked list**

{ struct node \*s;

if (last == NULL)

{ cout<<"List is empty, nothing to display"<<endl;

return;

}

s = last->next;

cout<<"Circular Link List: "<<endl;

while (s != last)

{

cout<<s->info<<" ";

s = s->next;

}

cout<<s->info<<endl;}

**//…12.To display date and time in C++**

#include<bits/stdc++.h> **//universal header file**

using namespace std;

int main( ) **//main function**

{ time\_t now = time(0);

char\* dt = ctime(&now);

cout << "The current date and time is: " << dt << endl;

return 0;

}

**OUTPUT**

**//….13.C++ program to display gray code of a decimal**

#include<bits/stdc++.h> **//universal header file**

using namespace std;

class gray

{ int a[8]={0},i,j;

public:  **//public member**

int dec\_gray(int x);

void gray\_code(int m);

void display();

};

int gray::dec\_gray(int x) **//function definition**

{ return x^(x>>1);

}

void gray::gray\_code(int m)

{

for(i=7;i>=0;i--)

{

if(m>0)

{

a[i]=m%2;

m=m/2;

}

else

break;

}}

void gray::display() **//display function**

{

for(i=0;i<8;i++)

cout<<a[i];

}

//MAIN FUNCTION

int main()

{ int n,res;

gray a;

cout<<"Decimal to Gray Code";

cout<<"\n Enter any Decimal number : ";

cin>>n;

res=a.dec\_gray(n);

a.gray\_code(res);

cout<<"\n Gray Code of "<<n<<" is ";

a.display();

return 0;

}

**OUTPUT**