



Data Structures

Basic Tasks using classes
with Algorithms.

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Chapter 1 Tasks

Task 1

Write an algorithm to get two numbers and calculate their sum

Code:

```
#include<iostream>

using namespace std;

class add
{
    int a,b,s;

    public:

        add()
        {

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

            cout<<"enter two numbers to find their sum"<<endl;

            cout<<"number 1: ";

            cin>>a;

            cout<<"number 2: ";

            cin>>b;

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

        }

        void sum()
        {
```

```
        s=a+b;

        cout<<"Sum of "<<a<<" and "<<b<<" is "<<endl;

        cout<<a<<" + "<< b<<" = "<<s<<endl;

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

    }

};

int main()

{

    add obj;

    obj.sum();

}
```

Algorithm

1. start
2. input 1st number in a
3. input 2nd number in b
4. add a into b and store result in s
5. print s
6. end

Output

```
-----
enter two numbers to find their sum
number 1: 5
number 2: 8
-----
Sum of 5 and 8 is
5 + 8 = 13
-----
```

Task 2

Write an algorithm to swap two numbers.

Code

```
#include<iostream>

using namespace std;

class exchange
{
    int a,b;

    public:

        exchange()
        {

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

            cout<<"enter two numbers"<<endl;

            cin>>a>>b;

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

            cout<<"you entered :"<<endl;

            cout<<"a="<a<<endl;

            cout<<"b="<b<<endl;

        }

        void swap()
        {

            int temp=a;

            a=b;
```

```
        b=temp;

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

        cout<<"swaped values are :"<<endl;

        cout<<"a="<<a<<endl;

        cout<<"b="<<b<<endl;

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

    }

};

int main()

{

    exchange ex;

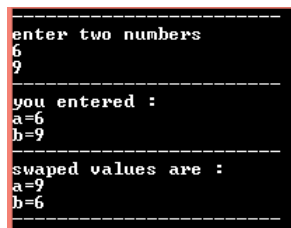
    ex.swap();

}
```

Algorithm

1. start
2. assign value to a
3. assign value to b
4. temp=a
5. a=b
6. b=temp
7. print a,b
8. end

Output:



```
-----
enter two numbers
6
9
-----
you entered :
a=6
b=9
-----
swaped values are :
a=9
b=6
-----
```

Task 3

Write an algorithm to swap the values of two integers without using a temporary variable.

Code

```
#include<iostream>

using namespace std;

class exchange
{
    int a,b;

    public:

        exchange()
        {

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

            cout<<"enter two numbers"<<endl;

            cin>>a>>b;

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

            cout<<"you entered :"<<endl;

            cout<<"a="<<a<<endl;

            cout<<"b="<<b<<endl;

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

        }

        void swap()
        {

            a=a+b;

            b=a-b;

            a=a-b;

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

            cout<<"swaped values are :"<<endl;
```

```
        cout<<"a="<<a<<endl;

        cout<<"b="<<b<<endl;

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

    }

};

int main()

{

    exchange ex;

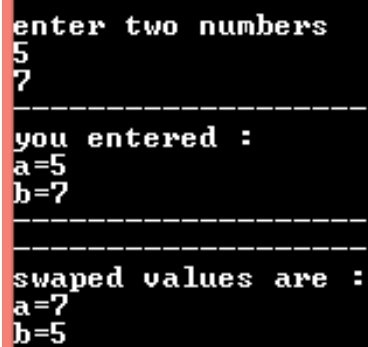
    ex.swap();

}
```

Algorithm

1. start
2. input a and b
3. $a=a+b$
4. $b=a-b$
5. $a=a-b$
6. print a and b
7. end

Output:



```
-----
enter two numbers
5
7
-----
you entered :
a=5
b=7
-----
swaped values are :
a=7
b=5
-----
```

Task 4

//Write an algorithm to find greater of two given numbers

Code:

```
#include<iostream>
```

```
using namespace std;
```

```
class greter
```

```
{
```

```
    int a,b;
```

```
    public:
```

```
        greter()
```

```
        {
```

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

```
            cout<<"enter two numbers"<<endl;
```

```
            cin>>a>>b;
```

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

```
        }
```

```
        void check()
```

```
        {
```

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

```
            if(a>b)
```

```
                cout<<a<<" is greater than "<<b<<endl<<a<<">"<<b<<endl;
```

```
            else if(b>a)
```

```
                cout<<b<<" is greater than "<<a<<endl<<b<<">"<<a<<endl;
```

```
        else

        cout<<a<<" is equal to "<<b<<endl<<a<<"="<<b<<endl;

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

    }

};

int main()

{

    greter g;

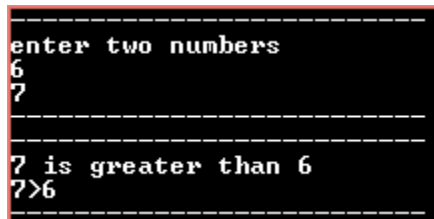
    g.check();

}
```

Algorithm

1. start
2. input two numbers in a and b
3. if a>b
4. print a is greater
5. else if
6. b>a
7. print b is greater
8. else
9. print both are equal
10. end

Output



```
enter two numbers
6
7
-----
7 is greater than 6
7>6
-----
```

Task 5

//Write an algorithm to find greater of three given numbers using nested if

Code:

```
#include<iostream>

using namespace std;

class andd
{
    int a,b,c;

    public:

        andd()
        {
            cout<<"-----"<<endl;

            cout<<"enter two numbers"<<endl;

            cin>>a>>b>>c;

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

        void check()
        {
            cout<<"-----"<<endl;

            if(a>b)

            if(a>c)

            cout<<"1st value is greater"<<endl;

            else cout<<"3rd value is greater"<<endl;

            else if(b>c)

            cout<<"2nd value is greater"<<endl;

            else

            cout<<"3rd value is greater"<<endl;
```

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

    }

};

int main()

{

    andd G;

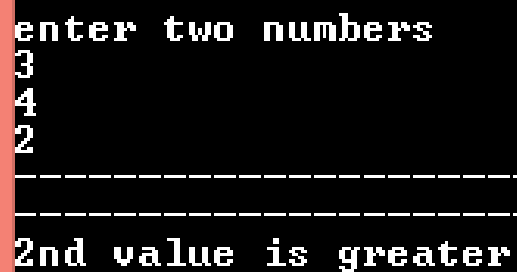
    G.check();

}
```

Algorithm

1. start
2. input three numbers
3. if a>b then
4. if a>c
5. then print a is greater
6. else
7. print c is greater
8. if b>c
9. print b is greater
10. else
11. c is greater
12. end

Output:



```
enter two numbers
3
4
2
2nd value is greater
```

Task 6

//write an algorithm to print 1st ten natural numbers using repeat for structure

Code

```
#include<iostream>

using namespace std;

class natural
{
    int c;

    public:

    void print()
    {

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

        cout<<"1st ten natural numbers are"<<endl;

        for(c=1;c<=10;c++)
        {

            cout<<c<<" , ";

        }

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

    }

};

int main()
{

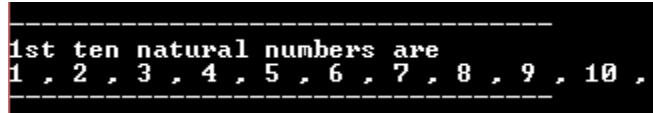
    natural n;
```

```
n.print();  
  
}
```

Algorithm

1. start
2. repeat step 3 for c=1 to 10 by 1
3. print c
4. exit loop
5. end

Output



```
1st ten natural numbers are  
-----  
1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9 , 10 ,
```

Task 7

//write an algorithm to print 1st ten natural numbers using repeat while structure

Code

```
#include<iostream>  
  
using namespace std;  
  
class ascii  
{  
  
    int c;  
  
    public:  
  
    void print()  
  
    {  
  
        cout<<"-----"<<endl;  
  
        cout<<"          Natural numbers"<<endl;
```

```
        c=1;

        while(c<=10)

        {

                cout<<c<<" ";

                c++;

        }

        cout<<endl;

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

    }

};

int main()

{

        asciï as;

        as.print();

}
```

Algorithm

1. start
2. repeat step 4 to 5 while (c<=10)
3. print c
4. c=c+1
5. exit loop
6. end

Output

```
-----
1st ten natural numbers are
1 , 2 , 3 , 4 , 5 , 6 , 7 , 8 , 9 , 10
-----
```

Task 8

//write an algorithm to change the case of string

Code

```
#include<iostream>

using namespace std;

class ascii
{
    char ch[];

public:
    ascii()
    {
        cout<<"-----"<<endl;

        cout<<"enter any name"<<endl;

        cin>>ch;
    }

    void cases()
    {
        cout<<"-----"<<endl;

        cout<<"\tCase changed"<<endl;

        for(int j=0;ch[j]!='\0';j++)
        {
            if(ch[j]>=65 && ch[j]<=90)

                ch[j]=ch[j]+32;
        }
    }
}
```

```
        else if(ch[j]>=97 && ch[j]<=122)

            ch[j]=ch[j]-32;

    }

    cout<<ch;

    cout<<endl;

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

}

};

int main()

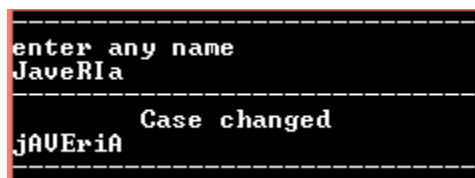
{

    ascii as;

    as.cases();

}
```

Output



```
-----
enter any name
JaveRIa
-----
           Case changed
jAUeRiA
-----
```

Task 9

Write an algorithm to find average of 3 numbers

Code

```
#include<iostream>

using namespace std;

class average
{
    int a,b,c,avg;

    public:

        average()
        {
            cout<<"-----"<<endl;

            cout<<"enter three numbers"<<endl;

            cin>>a>>b>>c;

        }

        void mean()
        {
            cout<<"-----"<<endl;

            avg=(a+b+c)/3;

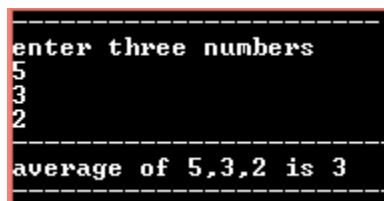
            cout<<"average of "<<a<<","<<b<<","<<c<<" is "<<avg<<endl;

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

        }
}
```

```
};  
  
int main()  
{  
  
    average av;  
  
    av.mean();  
  
}
```

Output

A terminal window with a black background and white text. The text shows the program's execution: a prompt to enter three numbers, followed by the inputs 5, 3, and 2, and finally the output message stating the average of these numbers is 3.

```
-----  
enter three numbers  
5  
3  
2  
-----  
average of 5,3,2 is 3  
-----
```