

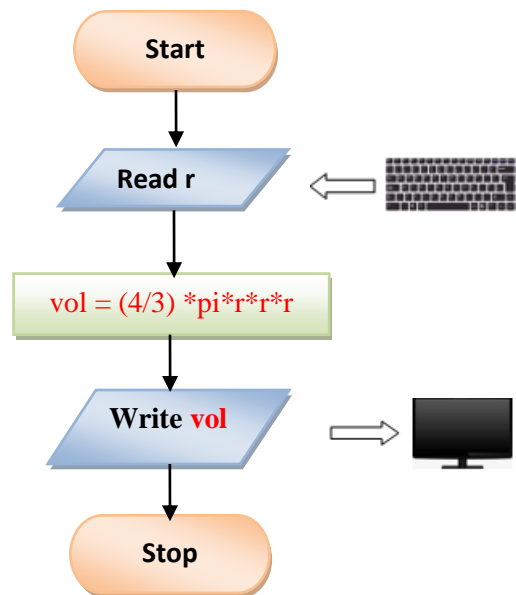
Solved Assignment Problems in C++ (with Algorithm and Flowchart)

Q1. Create a program to compute the volume of a sphere. Use the formula: $V = (4/3) * \pi * r^3$ where pi is equal to 3.1416 approximately. The r is the radius of sphere. Display the result.

Algorithm

1. Start
2. Read r
3. $vol = (4/3) * \pi * r * r * r$
4. Print or display vol
5. Stop

Flowchart



Program

```
#include<iostream>
using namespace std;

#define pi 3.1416

int main()
{
    /*we need to give only one input
    to program i.e., radius of sphere r*/
    int r;
    float vol;

    cout<<"Enter radius of sphere:"<<endl;
    cin>>r;

    vol = (4/3)*pi*r*r*r;

    cout<<"Volume of sphere is:"<<vol;

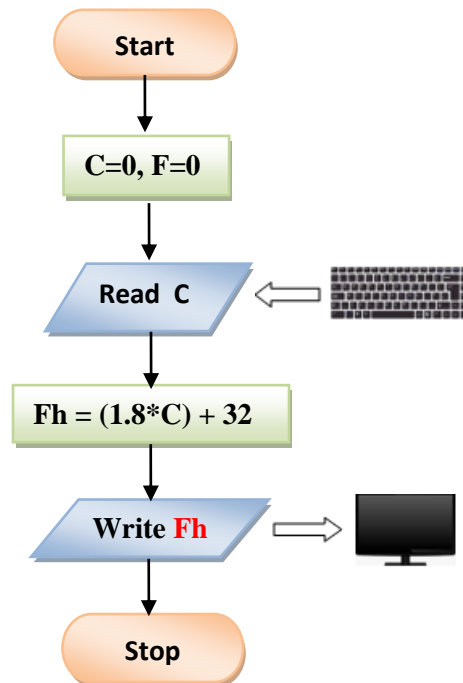
    return 0;
}
```

Q2. Write a program the converts the input Celsius degree into its equivalent Fahrenheit degree. Use the formula: $F = (9/5) * C + 32$.

Algorithm

1. Start
2. Initialize F=0, C=0
3. Read C
4. $F_h = (1.8 * C) + 32$
5. Print or display F_h
6. Stop

Flowchart



Program

```
#include<iostream>
using namespace std;

int main()
{
    /*we need to give only one input
    to program i.e., temperature in Celsius*/
    float C;
    float Fh;

    cout<<"Enter temperature in Celsius:"<<endl;
    cin>>C;

    Fh = (1.8*C)+32;
    cout<<"Converted Fahrenheit value is:"<<Fh;

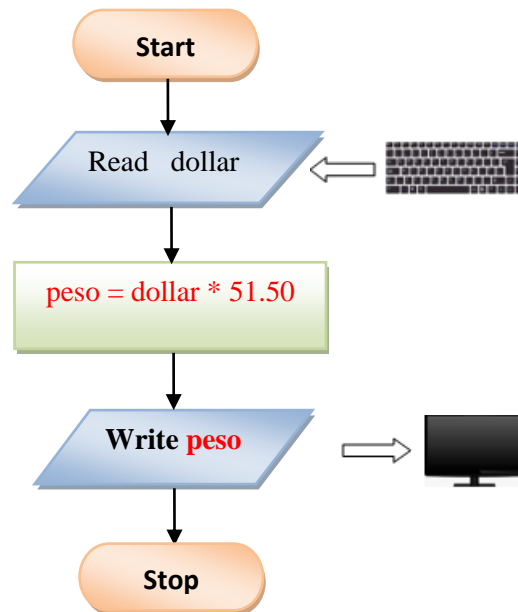
    return 0;
}
```

Q3. Write a program that converts the input dollar to its peso exchange rate equivalent. Assume that the present exchange rate is 51.50 pesos against the dollar. Then display the peso equivalent exchange rate.

Algorithm

1. Start
2. Read dollar
3. $\text{peso} = \text{dollar} * 51.50$
4. Print or display peso
5. Stop

Flowchart



Program

```
#include<iostream>
using namespace std;

int main()
{
    /*we need to give only one input
    to program i.e., Number of Dollars*/
    float dollar;

    float peso;
    cout<<"Enter dollars to convert:"<<endl;
    cin>>dollar;

    peso = dollar*51.50;
    cout<<"Equivalent peso is:"<<peso;

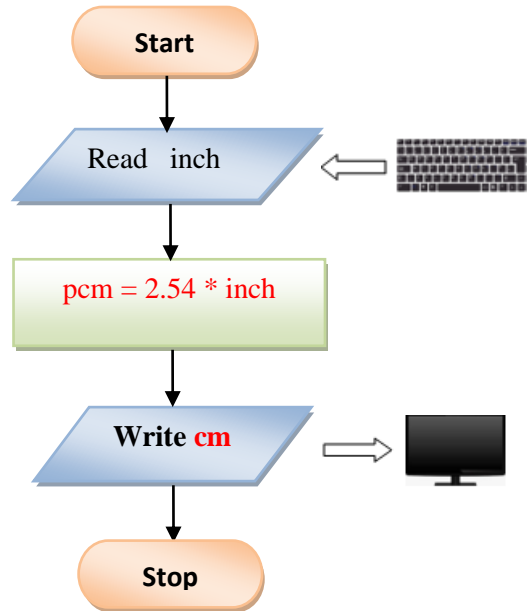
    return 0;
}
```

Q4. Write a program that converts an input inch(es) into its equivalent centimeters. Take note that one inch is equivalent to 2.54cms

Algorithm

1. Start
2. Read inch
3. $cm = 2.54 * inch$
4. Print or display **cm**
5. Stop

Flowchart



Program

```
#include<iostream>
using namespace std;

int main()
{
    /*we need to give only one input
    to program i.e., inches*/

    float inch;

    float cm;
    cout<<"Enter inches:"<<endl;
    cin>>inch;

    cm = 2.54* inch;
    cout<<"Equivalent peso is:"<<cm;

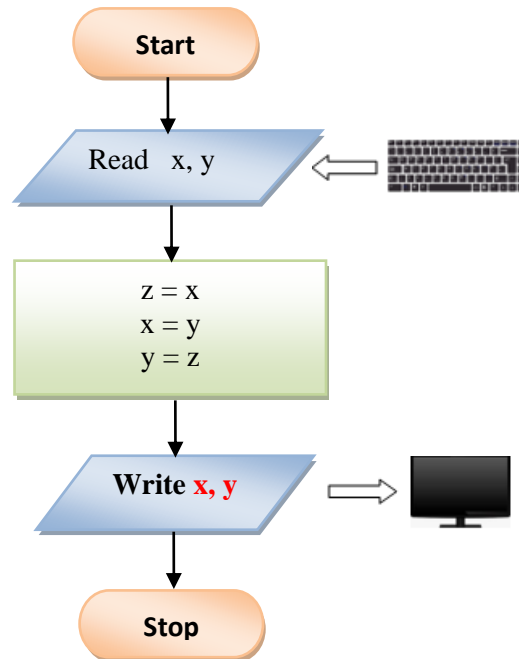
    return 0;
}
```

Q5. Write a program that exchanges the value of two variables: x and y. The output must be: the value of variable y will become the value of variable x, and vice versa.

Algorithm

1. Start
2. Read x, y
3. Declare third variable, z
 $z = x$
 $x = y$
 $y = z$
4. Print or display x, y
5. Stop

Flowchart



Program

```

#include<iostream>
using namespace std;

int main()
{
    //we need to give 2 inputs: x and y;
    int x, y;

    int z;

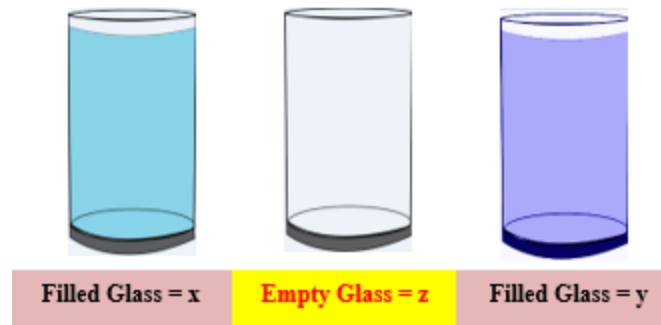
    cout<<"Enter values of x and y:"<<endl;
    cin>>x>>y;

    cout<<"Before swapping, x and y are:"<<x<<"\t"<<y;

    cout<<"\n";
    z = x;
    x = y;
    y =z;

    cout<<"After swapping, x and y are:"<<x<<"\t"<<y;

    return 0;
}
  
```

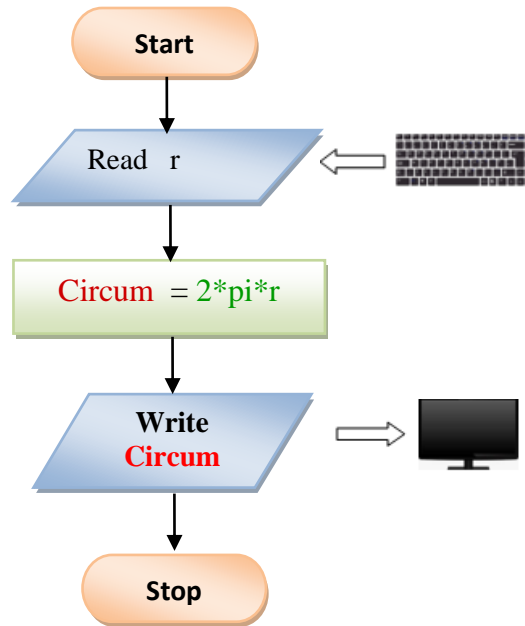


Q6. Design a program to find the circumference of a circle. Use the formula: $C=2\pi r$, where π is approximately equivalent 3.1416.

Algorithm

1. Start
2. Read r
3. Calculate circumference by the equation:
 $Circum = 2 * \pi * r$
4. Print **Circum**
5. Stop

Flowchart



Program

```
#include<iostream>
using namespace std;

#define pi 3.1416

int main()
{
    /*we need to give only one input
    to program i.e., radius of circle r*/

    int r;
    float Circum;
    cout<<"Enter radius of circle r:"<<endl;
    cin>>r;

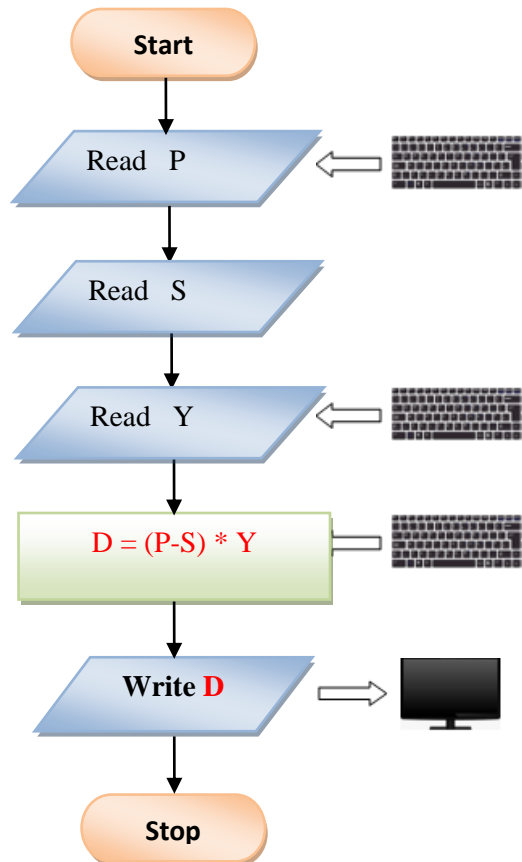
    Circum = 2*pi*r;
    cout<<"Circle circumference is:"<<Circum;
    return 0;
}
```

Q7. Write a program that takes as input the purchase price of an item (P), its expected number of years of service (Y) and its expected salvage value (S). Then outputs the yearly depreciation for the item (D). Use the formula: $D = (P - S) Y$

Algorithm

1. Start
2. Read P
3. Read S
4. Read Y
5. $D = (P-S) * Y$
6. Print or display D
7. Stop

Flowchart



Program

```
//P = purchase price of an item
//S = expected salvage value
//Y = expected number of years of service
//D = yearly depreciation for the item

#include<iostream>
using namespace std;

int main()
{
    //we need to give 3 inputs to the program i.e., P, S, Y
    float P, S, Y;
    float D;
    printf("Enter purchase price of an item P:\n");
    scanf("%f", &P);

    printf("Enter expected salvage value S:\n");
    scanf("%f", &S);

    printf("Enter expected number of years of service Y:\n");
    scanf("%f", &Y);

    D = (P-S)*Y;

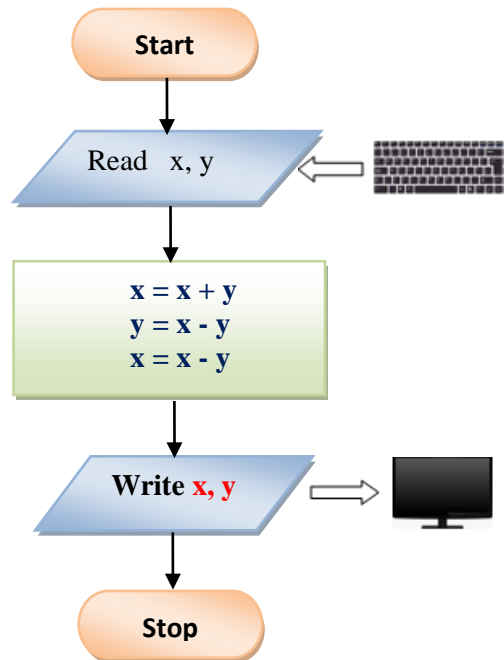
    printf("Product depreciation is: %f", D);
    return 0;
}
```

Q8. Swapping of 2 variables without using temporary (or 3rd variable)

Algorithm

1. Start
2. Read x and y
3. $x = x + y$
 $y = x - y$
 $x = x - y$
4. Print or display x, y
5. Stop

Flowchart



Program

```
#include<iostream>
using namespace std;

int main()
{
    //we need to give 2 inputs: x and y;
    int x, y;

    cout<<"Enter values of x and y:"<<endl;
    cin>>x>>y;

    cout<<"Before swapping, values of x and y are:"<<x<<"\t"<<y;
    cout<<endl;

    x = x+y; //suppose x = 10, y = 20, then x = 10+20 = 30
    y = x-y; //y = x-y = 30 - 20 = 10
    x = x-y; //x = x - y = 30 - 10 = 20

    cout<<"After swapping, values of x and y are:"<<x<<"\t"<<y;

    return 0;
}
```


Q9. Determine the most economical quantity to be stocked for each product that a manufacturing company has in its inventory: This quantity, called economic order quantity (EOQ) is calculated as follows: $EOQ = \sqrt{2RS/I}$ where: R= total yearly production requirement S=set up cost per order I=inventory carrying cost per unit

Algorithm

1. Start
2. Read R
3. Read S
4. Read I
5. $EOQ = (2 * R * S) / I$
6. Print EOQ
7. Stop

Flowchart



Program

```

//EOQ = economic order quantity
//R= total yearly production requirement
//S=set up cost per order
//I=inventory carrying cost per unit

#include<iostream>
using namespace std;

int main()
{
    //we need to give 3 inputs to the program i.e., P, S, Y
    float R, S, I;
    float EOQ;
    cout<<"Enter total yearly production R:"<<endl;
    cin>>R;

    cout<<"Enter set up cost S:"<<endl;
    cin>>S;

    cout<<"Enter inventory cost I:"<<endl;
    scanf("%f", &I);

    EOQ = (2 * R * S) / I;

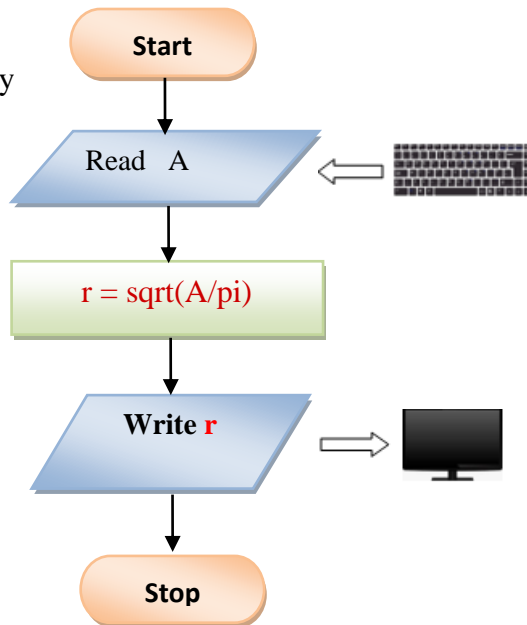
    cout<<"economic order quantity EOQ is:"<<EOQ;
    return 0;
}
  
```

Q10. Write a program to compute the radius of a circle. Derive your formula from the given equation: $A = \pi r^2$, then display the output.

Algorithm

1. Start
2. Read r
3. Calculate radius by the equation:
 $r = \sqrt{A/\pi}$
4. Write r
5. Stop

Flowchart



Program

```
//r2 = A/pi and r = sqrt(A/pi)

#include<iostream>
#include<math.h>
#define pi 3.1416
using namespace std;

int main()
{
    /*we need to give only one input
    to program i.e., area of circle A*/

    int A;
    float r;
    cout<<"Enter area of circle A:"<<endl;
    cin>>A;

    r = sqrt(A/pi);
    cout<<"Radius of circle is:"<<r;
    return 0;
}
```