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Sub: Data Structure

HW: 01

**Problem: Calculate The Bottom Area, volume and Surface Area of a cylinder.**

**Solution:**

```
#include <bits/stdc++.h>
using namespace std;

class Cylinder
{
private:
    double radius;
    double height;

public:
    // Constructor
    Cylinder(double r, double h) : radius(r), height(h) {}
    const double PI = 3.1416;

    // Function to calculate bottom (base) area
    double bottomArea()
    {
        return PI * radius * radius;
    }
    // Function to calculate volume
    double volume()
    {
        return bottomArea() * height;
    }
    // Function to calculate surface area
    double surfaceArea()
    {
        return 2 * PI * radius * (radius + height);
    }
};

int main()
{
    double radius, height;
    // Input radius and height
    cout << "Enter radius: " << endl;
    cin >> radius;
    cout << "Enter height: " << endl;
    cin >> height;
    // Create a Cylinder object
    Cylinder cyl(radius, height);
    // Output results
    cout << "Radius Of Cylinder: " << radius << ", Height Of Cylinder: " << height << endl;
    cout << "Bottom Area: " << cyl.bottomArea() << endl;
    cout << "Volume: " << cyl.volume() << endl;
    cout << "Surface Area: " << cyl.surfaceArea() << endl;

    return 0;
}
```

```
// Input Text
Enter Radius: 4
Enter Height: 5

//Output
Enter radius:
Enter height:
Radius Of Cylinder: 4, Height Of Cylinder: 5
Bottom Area: 50.2656
Volume: 251.328
Surface Area: 226.195
```

```
Cylinder.cpp x input.txt
Cylinder.cpp > ...
1  #include <bits/stdc++.h>
2  using namespace std;
3
4  class Cylinder
5  {
6  private:
7      double radius;
8      double height;
9
10 public:
11     // Constructor
12     Cylinder(double r, double h) : radius(r), height(h) {}
13     const double PI = 3.1416;
14
15     // Function to calculate bottom (base) area
16     double bottomArea()
17     {
18         return PI * radius * radius;
19     }
20
21     // Function to calculate volume
22     double volume()
23     {
24         return bottomArea() * height;
25     }
26
27     // Function to calculate surface area
28     double surfaceArea()
29     {
30         return 2 * PI * radius * (radius + height);
31     }
32 };
33
34 int main()
35 {
36     double radius, height;
37
38     // Input radius and height
39     cout << "Enter radius: " << endl;
40     cin >> radius;
41     cout << "Enter height: " << endl;
42     cin >> height;
43
44     // Create a Cylinder object
45     Cylinder cyl(radius, height);
46
47     // Output results
48     cout << "Radius Of Cylinder: " << radius << ", Height Of Cylinder: " << height << endl;
49     cout << "Bottom Area: " << cyl.bottomArea() << endl;
50     cout << "Volume: " << cyl.volume() << endl;
51     cout << "Surface Area: " << cyl.surfaceArea() << endl;
52
53     return 0;
54 }
55
56
```

input.txt X

input.txt

1 4 5

output.txt X

output.txt

1 Enter radius:

2 Enter height:

3 Radius Of Cylinder: 4, Height Of Cylinder: 5

4 Bottom Area: 50.2656

5 Volume: 251.328

6 Surface Area: 226.195

7