

```

1 //abstract class solid: cylinder,cone,sphere
2 //find surface-area and volume
3
4 import java.util.Scanner;
5 import java.lang.Math;
6
7 abstract class Solid{
8     int radius,height;
9     Solid(int r,int h){
10         radius = r;
11         height = h;
12     }
13     Solid(int r){
14         radius = height = r;
15     }
16     abstract void surfacearea();
17     abstract void volume();
18 }
19
20 class cylinder extends Solid{
21     cylinder(int r,int h){
22         super(r,h);
23     }
24     void surfacearea(){
25         System.out.println("Surface area of cylinder: "+ (2*3.14*radius*(radius + height)));
26     }
27     void volume(){
28         System.out.println("Surface area of cylinder: "+ (3.14*radius*radius*height));
29     }
30 }
31 class cone extends Solid{
32     cone(int r,int h){
33         super(r,h);
34     }
35     void surfacearea(){
36         System.out.println("Surface area of cone: "+ (2*3.14*radius*Math.sqrt(radius*radius + height*height)));
37     }
38     void volume(){
39         System.out.println("Volume of cone: "+ (3.14*radius*radius*height/3));
40     }
41 }
42 class sphere extends Solid{
43     sphere(int r){
44         super(r);

```

```

45     }
46     void surfacearea(){
47         System.out.println("Surface area of sphere: "+ (4*3.14*radius*radius));
48     }
49     void volume(){
50         System.out.println("Volume of sphere: "+ (4*3.14*radius*radius*radius/3));
51     }
52 }
53
54 class SolidDemo{
55     public static void main(String args[]){
56         Scanner sc = new Scanner(System.in);
57         int r,h,choice;
58         while(true){
59             System.out.print("Enter choice: 1.Cylinder 2.Cone 3.Sphere 4.Exit - ");
60             choice = sc.nextInt();
61             switch(choice){
62                 case 1: System.out.print("Enter radius: ");
63                     r = sc.nextInt();
64                     System.out.print("Enter height: ");
65                     h = sc.nextInt();
66                     cylinder c = new cylinder(r,h);
67                     c.surfacearea();
68                     c.volume();
69                     break;
70                 case 2: System.out.print("Enter radius: ");
71                     r = sc.nextInt();
72                     System.out.print("Enter Height: ");
73                     h = sc.nextInt();
74                     cone cl = new cone(r,h);
75                     cl.surfacearea();
76                     cl.volume();
77                     break;
78                 case 3: System.out.print("Enter radius: ");
79                     r = sc.nextInt();
80                     sphere s = new sphere(r);
81                     s.surfacearea();
82                     s.volume();
83                     break;
84                 case 4: System.exit(0);
85                 default: System.exit(0);
86             }
87         }

```

Output:

```
Enter choice: 1.Cylinder 2.Cone 3.Sphere 4.Exit - 1
Enter radius: 7
Enter height: 7
Surface area of cylinder: 615.44
Surface area of cylinder: 1077.02
Enter choice: 1.Cylinder 2.Cone 3.Sphere 4.Exit - 2
Enter radius: 7
Enter Height: 14
Surface area of cone: 688.0828380362353
Volume of cone: 718.0133333333333
Enter choice: 1.Cylinder 2.Cone 3.Sphere 4.Exit - 3
Enter radius: 7
Surface area of sphere: 615.44
Volume of sphere: 1436.0266666666666
Enter choice: 1.Cylinder 2.Cone 3.Sphere 4.Exit - 4
<<< Process finished (PID=40728). (Exit code 0)
===== READY =====
```