1. What gets printed? Please show output as it will appear or indicate “NO OUTPUT”. If it’s an infinite loop, be sure to show some of the output followed by “INFINITE LOOP.”

```java
int a = 4;
while (a < 8) {
    a++;
    System.out.println(a);
}
```

Output:
```
5
6
7
8
```

```java
int a = 4;
while (a < 8) {
    System.out.println(a);
    a--;
}
```

Output:
```
4
3
2
... INFINITE LOOP
```

```java
int a = 4;
while (a <= 5) {
    System.out.println(2*a);
    a++;
}
```

Output:
```
8
10
```

```java
int a = 4;
while (a < 14) {
    System.out.println(a);
    a = a + 3;
}
```

Output:
```
4
7
10
13
```
2. Let’s look at the problem of repeatedly obtaining input and performing a calculation, for example, computing the circumference of a circle given its radius, using the following algorithm:

```
Variables:
    radius, circ

Algorithm:
    input radius
    circ = 2 * radius * PI
    print circ
```

Rewrite this algorithm, modifying it so that it uses a while structure to repeat the processing of each input in two different ways.

a) Keep computing circumferences and ask each time whether to keep going.

```
Variables:
    radius, circ, ans

Algorithm:

    ans = 1
    while (ans equals 1)
        input radius
        circ = 2 * radius * PI
        print circ
        print “do another?”
        input ans
```

b) Compute the circumferences of 10 circles (exact count).

```
Variables:
    radius, circ, count

Algorithm:

    count = 1
    while (count <= 10)
        input radius
        circ = 2 * radius * PI
        print circ
        count = count + 1
```
1. What gets printed? Please show output as it will appear or indicate “NO OUTPUT”. If it’s an infinite loop, be sure to show some of the output followed by “INFINITE LOOP.”

```java
int a = 4;
while (a > 0)
{
    System.out.println(a);
    a++;
}
```

Output: 
```
4
5
6
... INFINITE LOOP
```

```java
int a = 4;
while (a > 0)
{
    System.out.println(a);
    a = a - 2;
}
```

Output: 
```
4
2
```

```java
int a = 1;
while (a < 4)
{
    a++;
    System.out.println(a);
}
```

Output: 
```
2
3
4
```

```java
int a = 4;
while (a < 4)
{
    System.out.println (a);
    a++;
}
```

Output: 
```
NO OUTPUT
```
2. Let’s look at the problem of repeatedly obtaining input and performing a calculation, for example, computing the area of a circle given its radius, using the following algorithm:

<table>
<thead>
<tr>
<th>Variables:</th>
<th>radius, area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algorithm:</td>
<td>input radius</td>
</tr>
<tr>
<td></td>
<td>area = radius<em>radius</em> PI</td>
</tr>
<tr>
<td></td>
<td>print area</td>
</tr>
</tbody>
</table>

Rewrite this algorithm, modifying it so that it uses a while structure to repeat the processing of each input in two different ways.

a) Compute the areas of 5 circles (exact count).

<table>
<thead>
<tr>
<th>Variables:</th>
<th>radius, area, count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algorithm:</td>
<td>count = 1</td>
</tr>
<tr>
<td></td>
<td>while (count &lt;= 5)</td>
</tr>
<tr>
<td></td>
<td>input radius</td>
</tr>
<tr>
<td></td>
<td>area = radius * radius* PI</td>
</tr>
<tr>
<td></td>
<td>print area</td>
</tr>
<tr>
<td></td>
<td>count = count + 1</td>
</tr>
</tbody>
</table>

b) Keep computing circle areas until user inputs -1 for the radius (sentinel value)

<table>
<thead>
<tr>
<th>Variables:</th>
<th>radius, area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algorithm:</td>
<td>input radius</td>
</tr>
<tr>
<td></td>
<td>while (radius != -1)</td>
</tr>
<tr>
<td></td>
<td>area = radius * radius* PI</td>
</tr>
<tr>
<td></td>
<td>print area</td>
</tr>
<tr>
<td></td>
<td>input radius</td>
</tr>
</tbody>
</table>