Lecture 12: Loops Worksheet Solutions

1) When the following loops execute, how many times do they print "Duck"?

```java
int i=0;
while (i<=3) {
    println("Duck");
i=i+1;
}
println("Goose");
// How many ducks? __4__
// i = 0, 1, 2, 3
```

```java
int i = 1;
while (i < 10) {
    println("Duck");
i = i + 3;
}
println("Goose");
// How many ducks? __3__
// i = 1, 4, 7
```

2) Fill in the table below detailing what happens on every iteration of the loop:

```java
int v = 1;
while (v != -5) {
    rect(10*v, 10*v, 20, 20);
v = -2*v+1;
}
```

<table>
<thead>
<tr>
<th>Iteration</th>
<th>v</th>
<th>Condition</th>
<th>Executed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>true</td>
<td>rect(10, 10, 20, 20);</td>
</tr>
<tr>
<td>2</td>
<td>-1</td>
<td>true</td>
<td>rect(-10, -10, 20, 20);</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>true</td>
<td>rect(30, 30, 20, 20);</td>
</tr>
<tr>
<td>4</td>
<td>-5</td>
<td>false</td>
<td>[exit loop]</td>
</tr>
</tbody>
</table>

3) Given the for-loop below, draw the result on the grid using Processing’s coordinate system:

```java
noFill();
int i = 1;
while (i <= 3) {
    rect(2*i-1, i, 4-i, 4-i
    i = i + 1;
}
```

4) Complete the loop below to draw the 4 circles of
radius 30 shown in the image:

Solution #1:  
```cpp
int c = 0;
while (c < 4) {
    ellipse(50, 60 + 60*c, 60, 60);
    c = c + 1;
}
```

Solution #2:  
```cpp
int c = 1;
while (c < 5) {
    ellipse(50, 60*c, 60, 60);
    c = c + 1;
}
```

Solution #3:  
```cpp
int c = 60;
while (c <= 240) {
    ellipse(50, c, 60, 60);
    c = c + 60;
}
```

Solution #4:  
```cpp
int c = 5;
while (c > 0) {
    ellipse(50, 60*c, 60, 60);
    c = c - 1;
}
```

Other solution variants exist!