Exercises: Loops

Code Reading

1. What is the output of the following program?

```java
String alpha = "abcdefg";
for(int i = 3; i < alpha.length(); i++) {
    System.out.println(alpha.charAt(i));
}
```

2. What is the output of the following program?

```java
int i = 9;
while (i < 21) {
    System.out.println(i);
    i += i / 4;
}
```
3. What is the output of the following program?

```java
String alpha = "Yet another sentence another example to read";
while(alpha.indexOf(' ') > -1) {
    String word = alpha.substring(0, alpha.indexOf(' '));
    if (word.length() > 6) {
        System.out.print(word + " ");
    } else {
        for(int i = 0; i < word.length(); i++) {
            System.out.print("_");
        }
        System.out.print(" ");
    }
    alpha = alpha.substring(alpha.indexOf(' ') + 1, alpha.length());
}
```

4. What is the output of the following program?

```java
int value = 2;

do {
    if (value == 2 || value == 6) {
        System.out.println("*");
    } else if (value == 3 || value == 9 || value == 10) {
        System.out.print(value + " ");
    } else {
        System.out.print((value*2) + " ");
    }
    value++;
} while (value < 10);
```
Code Writing

5. Write a loop that prints the numbers 1-10.

6. Write a loop that prints the numbers 0-9.

7. Write a loop that prints the first 10 even numbers (0, 2, 4, ... 16, 18).

8. Write a loop that prints the first \( n \) even numbers (assume that a variable \( n \) of type \texttt{int} has been defined for you). (\textit{Hint}: Think how you can modify the loop from the previous question.)

9. Write a loop that prints the next 10 even numbers starting from \( n \) (you may assume that \( n \) has been defined and is an even number). For example, if \( n \) was 4, you would print 4, 6, 8, ..., 20, 22.
10. Write a loop that prints the first 10 multiples of some given number $n$ (you may assume that $n$ has been defined). For example, if $n$ is 3, your loop should print 3, 6, 9, . . . , 24, 27, 30.

11. Write a loop that sums together the numbers 1 through 10 and prints the result at the end of the loop.

12. Write a loop that calculates $10!$ (10 factorial, defined as $10! = 10 \times 9 \times 8 \times \ldots \times 2 \times 1$) and prints the result at the end of the loop.
13. Write a program that prints a block of stars with the same width/height, as defined in the variable `int widthHeight`. Below is an example for `widthHeight = 5`.

```
*****
*****
*****
*****
*****
```

14. Write a program that prints a patchwork of stars with the same width/height, as defined in the variable `int widthHeight`. The very first printed character should always be a star. Below is an example for `widthHeight = 5`.

```
* * *
* *
* * *
* *
* * *
```