Upload your source code to blackboard when you have completed all exercises *(Content → Submissions)*.

Q.1

The following code:

```
public class Methods {

   public static void main(String[] args) {
      displayMessage();
      displayMessage();
   }

   public static void displayMessage() {
      System.out.println("Hello World!");
   }

}
```

produces the following output:

```
Hello World!
Hello World!
```

Study the above code and write a program to produce the following output:

```
Mantra for semester two:
Programming is easy, I am going to nail Java in semester two.
Programming is easy, I am going to nail Java in semester two.
Programming is easy, I am going to nail Java in semester two.
Programming is easy, I am going to nail Java in semester two.
Programming is easy, I am going to nail Java in semester two.
Programming is easy, I am going to nail Java in semester two.
Programming is easy, I am going to nail Java in semester two.
Programming is easy, I am going to nail Java in semester two.
Programming is easy, I am going to nail Java in semester two.
Programming is easy, I am going to nail Java in semester two.
```

You should use a loop and a method in your code. Note that, in practice, you rarely write a method with just a single statement. The goal of this exercise, however, is simply to introduce you to the concepts of writing and calling your own methods.

Q.2

What is the output of the following Java program? Write the code below and examine the output.

```
public class HierarchicalMethods
{
   public static void method1()
   {
      System.out.println("I am method 1.");
   }

   public static void method2()
   {
      method1();
      System.out.println("I am method 2.");
   }

   public static void method3()
   {
      method2();
      System.out.println("I am method 3.");
      method1();
   }

   public static void main(String[] args)
   {
      method1();
      method3();
      method2();
      method3();
   }
}
```

Q.3

Write methods to draw each of the following shapes:

```
drawHair    ||||
drawEyes    *  *
drawNose     <>
drawMouth   <-->
```

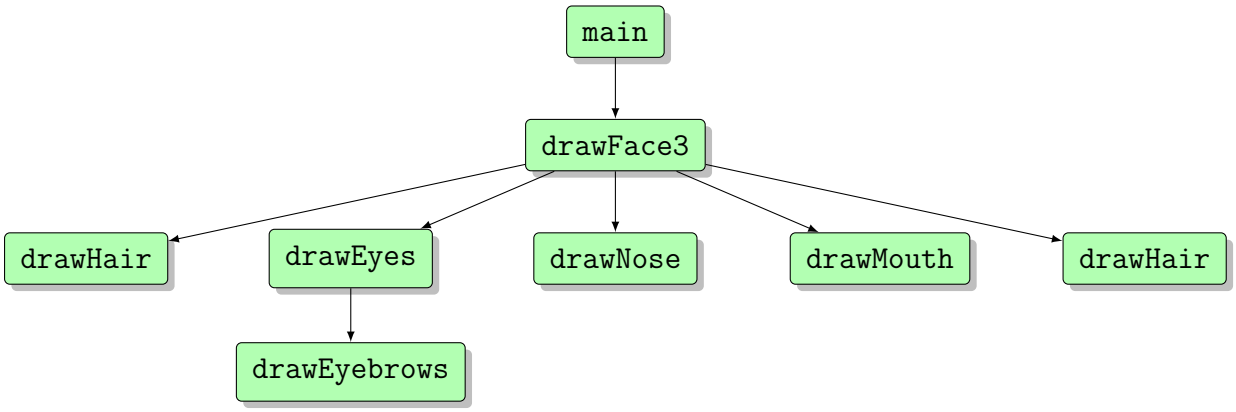
Write methods, `drawFace1` and `drawFace2` to draw the following faces:

```
||||        *  *
*  *         <>
 <>         <-->
<-->        ||||
```

Add a method `drawEyebrows` that is called from `drawEyes`:

```
drawEyebrows " "
```

Write a program that implements the following structure chart:



The output of your program should look as follows:

```
||||
"  "
*  *
 <>
<-->
||||
```

Q.4

The following code prints the first seven verses to the nursery rhyme "This is the house that Jack built":

```
public class HouseThatJackBuilt
{
   public static void main(String[] args)
   {
       verse1();
       verse2();
       verse3();
       verse4();
       verse5();
       verse6();
       verse7();
   }

   public static void verse1()
   {
       System.out.println("This is the house that Jack built.");
       System.out.println();
   }

   public static void text1()
   {
       System.out.println("That lay in the house that Jack built.");
       System.out.println();
   }

   public static void verse2()
   {
       System.out.println("This is the malt");
       text1();
   }

   public static void text2()
   {
       System.out.println("That ate the malt");
       text1();
   }

   public static void verse3()
   {
       System.out.println("This is the rat,");
       text2();
   }
```

```
    public static void text3()
    {
        System.out.println("That killed the rat,");
        text2();
    }

    public static void verse4()
    {
        System.out.println("This is the cat,");
        text3();
    }

    public static void text4()
    {
        System.out.println("That worried the cat,");
        text3();
    }

    public static void verse5()
    {
        System.out.println("This is the dog,");
        text4();
    }

    public static void text5()
    {
        System.out.println("That tossed the dog,");
        text4();
    }

    public static void verse6()
    {
        System.out.println("This is the cow with the crumpled horn,");
        text5();
    }

    public static void text6()
    {
        System.out.println("That milked the cow with the crumpled horn,");
        text5();
    }

    public static void verse7()
    {
        System.out.println("This is the maiden all forlorn");
        text6();
    }
}
```

```
This is the house that Jack built.

This is the malt
That lay in the house that Jack built.

This is the rat,
That ate the malt
That lay in the house that Jack built.

This is the cat,
That killed the rat,
That ate the malt
That lay in the house that Jack built.

This is the dog,
That worried the cat,
That killed the rat,
That ate the malt
That lay in the house that Jack built.

This is the cow with the crumpled horn,
That tossed the dog,
That worried the cat,
That killed the rat,
That ate the malt
That lay in the house that Jack built.

This is the maiden all forlorn
That milked the cow with the crumpled horn,
That tossed the dog,
That worried the cat,
That killed the rat,
That ate the malt
That lay in the house that Jack built.
```

Study the above code and write a program (using methods to eliminate any redundancy) to print the lyrics to "There was an old lady who swallowed a fly":

There was an old woman who swallowed a fly.
I don't know why she swallowed that fly,
Perhaps she'll die.

There was an old woman who swallowed a spider,
That wriggled and iggled and jiggled inside her.
She swallowed the spider to catch the fly,
I don't know why she swallowed that fly,
Perhaps she'll die.

There was an old woman who swallowed a bird,
How absurd to swallow a bird.
She swallowed the bird to catch the spider,
She swallowed the spider to catch the fly,
I don't know why she swallowed that fly,
Perhaps she'll die.

There was an old woman who swallowed a cat,
Imagine that to swallow a cat.
She swallowed the cat to catch the bird,
She swallowed the bird to catch the spider,
She swallowed the spider to catch the fly,
I don't know why she swallowed that fly,
Perhaps she'll die.

There was an old woman who swallowed a dog,
What a hog to swallow a dog.
She swallowed the dog to catch the cat,
She swallowed the cat to catch the bird,
She swallowed the bird to catch the spider,
She swallowed the spider to catch the fly,
I don't know why she swallowed that fly,
Perhaps she'll die.

There was an old woman who swallowed a horse,
She died of course.

Q.5

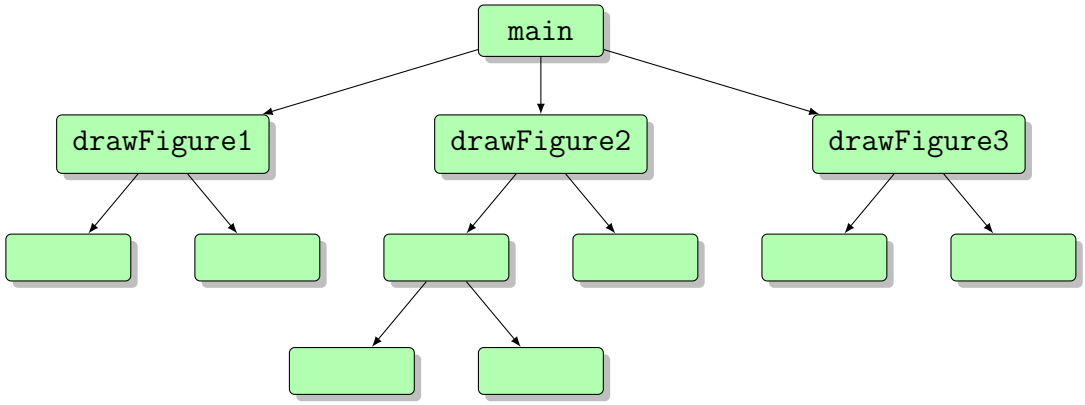
You are tasked with writing a program to print the following figures:

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

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

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

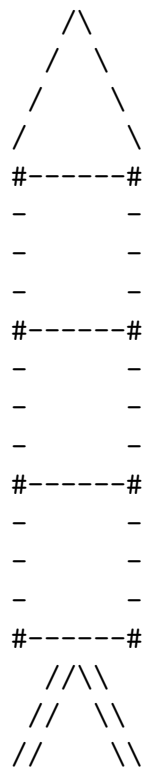
Complete the following structure chart and implement the program. The three vertical asterixes are only used once in this question but you may assume they would be reused.



Your program should have a total of seven methods (including `main`) and follow the hierarchical arrangement of the above structure chart (e.g. `drawFigure2` should call two methods, one of which calls a further two methods).

Q.6

Using methods to eliminate code redundancy, write a program to draw the following shuttle:



You should write a method called `shuttle` that is to be called from `main`. Begin by drawing a structure chart for your program.

Note that your code should not contain any duplicate `print` statements, e.g. the string `#------#` should only appear once in your program.