**PROJECT Steganography and Secret Messages - Using Arrays in Java**

**Objective** To type a simple Java program, execute ( run ) the program for some particular values, observe the output and then modify the program.

***PROJECT DESCRIPTION***

Type, compile and run the basic Java program that is shown in **Figure 1** , which follows.  
 Then compile and run your program, observe the output then modify the program.

***Information About This Project***

Steganography is related to cryptography and attempts to disguise a message

in a plaintext statement block.

Consider receiving the text message that is shown below.

the plaintext message reads as:

Hello Stan and Marilyn!

Let us meet for lunch

at noon on Tuesday.

We will be waiting

at the East building of

train station C.

I will ask Hank, Quincy,

Denise, Eddy and Roni

to join us there!

Best Regards,

KZ

Using the grid below, write the above message into the cells below - use one letter per cell. Use lower case letters.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| **line 1** | **H** | **e** | **l** | **l** | **o** |  | **S** | **t** | **a** | **n** |  | **a** | **n** | **d** |  | **M** | **a** | **r** | **i** | **l** | **y** | **n** | **!** |  |
| **line 2** | **L** | **e** | **t** |  | **u** | **s** |  | **m** | **e** | **e** | **t** |  | **f** | **o** | **r** |  | **l** | **u** | **n** | **c** | **h** |  |  |  |
| **line 3** | **a** | **t** |  | **n** | **o** | **o** | **n** |  | **o** | **n** |  | **T** | **u** | **e** | **s** | **d** | **a** | **y** | **.** |  |  |  |  |  |
| **line 4** | **W** | **e** |  | **w** | **i** | **l** | **l** |  | **b** | **e** |  | **w** | **a** | **i** | **t** | **i** | **n** | **g** |  |  |  |  |  |  |
| **line 5** | **a** | **t** |  | **t** | **h** | **e** |  | **E** | **a** | **s** | **t** |  | **b** | **u** | **i** | **l** | **d** | **i** | **n** | **g** |  | **o** | **f** |  |
| **line 6** | **t** | **r** | **a** | **i** | **n** |  | **s** | **t** | **a** | **t** | **i** | **o** | **n** |  | **C** | **.** |  |  |  |  |  |  |  |  |
| **line 7** | **I** |  | **w** | **i** | **l** | **l** |  | **a** | **s** | **k** |  | **H** | **a** | **n** | **k** | **,** |  | **Q** | **u** | **i** | **n** | **c** | **y** | **,** |
| **line 8** | **D** | **e** | **n** | **i** | **s** | **e** | **,** |  | **E** | **d** | **d** | **y** |  | **a** | **n** | **d** |  | **R** | **o** | **n** | **i** |  |  |  |
| **line 9** | **t** | **o** |  | **j** | **o** | **i** | **n** |  | **u** | **s** |  | **t** | **h** | **e** | **r** | **e** | **!** |  |  |  |  |  |  |  |
| **line 10** | **B** | **e** | **s** | **t** |  | **R** | **e** | **g** | **a** | **r** | **d** | **s** | **,** |  |  |  |  |  |  |  |  |  |  |  |
| **line 11** | **K** | **Z** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **line 12** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Then attempt to extract a complete message from the plaintext.

A partial example of a practical covert, spy - like message that can be taken from the plaintext would be:

**time to launch drone BETA**

***Steps to Complete This Project***

**STEP 1**  **Open NetBeans**

Open NetBeans and create a Java project with the following details.

For Project Name include **Lab8**

For the Main Class include **lab8.Steganography**

In your **Code** window, shown below, copy in the program code shown in **Figure 1** below, in the appropriate places, except substitute your own name in place of Sammy Student.

**PROJECT Steganography and Secret Messages - Using Arrays in Java**

**Figure 1 Source Code for the Steganography Program**

|  |
| --- |
| **import javax.swing.JOptionPane;**  **//Sammy Student, Programmer**  **public class Steganography**  **{**  **public static void main(String args[])**  **{**  **// the plaintext message**  **String line1 = "Hello Stan and Marilyn!";**  **String line2 = "Let us meet for lunch";**  **String line3 = "at noon on Tuesday.";**  **String line4 = "We will be waiting";**  **String line5 = "at the East building of";**  **String line6 = "train station C.";**  **String line7 = "I will ask Hank, Quincy,";**  **String line8 = "Denise, Eddy and Roni";**  **String line9 = "to join us there!";**  **String line10 = "Best Regards,";**  **String line11 = "KZ";**  **String message = "\n";**    **// display the plaintext message**  **message += "\t" + line1 + "\n";**  **message += "\t" + line2 + "\n";**  **message += "\t" + line3 + "\n";**  **message += "\t" + line4 + "\n";**  **message += "\t" + line5 + "\n";**  **message += "\t" + line6 + "\n";**  **message += "\t" + line7 + "\n";**  **message += "\t" + line8 + "\n";**  **message += "\t" + line9 + "\n";**  **message += "\t" + line10 + "\n";**  **message += "\t" + line11 + "\n";**  **JOptionPane.*showMessageDialog*(null, "Message: " + message,**  **"Plaintext Message", JOptionPane.*PLAIN\_MESSAGE*);**    **// convert plaintext message to lower case**  **line1 = line1.toLowerCase();**  **line2 = line2.toLowerCase();**  **line3 = line3.toLowerCase();**  **line4 = line4.toLowerCase();**  **line5 = line5.toLowerCase();**  **line6 = line6.toLowerCase();**  **line7 = line7.toLowerCase();**  **line8 = line8.toLowerCase();**  **line9 = line9.toLowerCase();**  **line10 = line10.toLowerCase();**  **line11 = line11.toLowerCase();** |

**PROJECT Steganography and Secret Messages - Using Arrays in Java**

**Figure 1 Source Code for the Steganography Program ( continued )**

|  |
| --- |
| **String plaintext = "\n";**  **plaintext += "\t" + line1 + "\n";**  **plaintext += "\t" + line2 + "\n";**  **plaintext += "\t" + line3 + "\n";**  **plaintext += "\t" + line4 + "\n";**  **plaintext += "\t" + line5 + "\n";**  **plaintext += "\t" + line6 + "\n";**  **plaintext += "\t" + line7 + "\n";**  **plaintext += "\t" + line8 + "\n";**  **plaintext += "\t" + line9 + "\n";**  **plaintext += "\t" + line10 + "\n";**  **plaintext += "\t" + line11 + "\n";**    **JOptionPane.*showMessageDialog*(null, "Message (lower case): " + plaintext,**  **"Lower Case", JOptionPane.*PLAIN\_MESSAGE*);**    **// define line messages field size with 20 indices**  **int[] num =   {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20};**    **// define the key variable and message object**  **int key = 0;**  **StringBuilder s = new StringBuilder();**    **// build the secret message**  **s.append("\n"); // new line**  **key = num[7]; // t**  **s.append(line1.substring(key, key + 1));**  **key = num[18]; // i**  **s.append(line1.substring(key, key + 1));**  **key = num[7]; // m**  **s.append(line2.substring(key, key + 1));**  **key = num[8]; // e**  **s.append(line2.substring(key, key + 1));**  **s.append(" "); // space**  **key = num[1]; // t**  **s.append(line3.substring(key, key + 1));**  **key = num[5]; // o**  **s.append(line3.substring(key, key + 1));**  **s.append(" "); // space** |

**PROJECT Steganography and Secret Messages - Using Arrays in Java**

**Figure 1 Source Code for the Steganography Program ( continued )**

|  |
| --- |
| **key = num[5]; // l**  **s.append(line4.substring(key, key + 1));**  **key = num[12]; // a**  **s.append(line4.substring(key, key + 1));**  **key = num[13]; // u**  **s.append(line5.substring(key, key + 1));**  **key = num[18]; // n**  **s.append(line5.substring(key, key + 1));**  **key = num[14]; // c**  **s.append(line6.substring(key, key + 1));**  **key = num[11]; // h**  **s.append(line7.substring(key, key + 1));**    **s.append("\n"); // new line**  **key = num[15]; // d**  **s.append(line6.substring(key, key + 1));**  **key = num[15]; // r**  **s.append(line6.substring(key, key + 1));**  **key = num[15]; // o**  **s.append(line6.substring(key, key + 1));**  **key = num[15]; // n**  **s.append(line6.substring(key, key + 1));**  **key = num[15]; // e**  **s.append(line6.substring(key, key + 1));**  **s.append(" ");**  **key = num[15]; // B**  **s.append(line6.substring(key, key + 1));**  **key = num[15]; // E**  **s.append(line6.substring(key, key + 1));**  **key = num[15]; // T**  **s.append(line6.substring(key, key + 1));**  **key = num[15]; // A**  **s.append(line6.substring(key, key + 1));**    **s.append("\n"); // new line**    **System.*out*.println("a steganography secret " + s);**  **JOptionPane.*showMessageDialog*(null, "Secret Message: " + s,**  **"Decoded", JOptionPane.*PLAIN\_MESSAGE*);**  **}**  **}** |

**PROJECT Steganography and Secret Messages - Using Arrays in Java**

**STEP 2 Build, Compile and Run the Program**

From the NetBeans Run menu select Run Project ( Lab8 ) to run your app.

**STEP 3 Test the Program**

Once you have successfully compiled your program, review the output that appears in the message boxes that follow in **Figure 2** .

The message boxes show the plaintext message in sentence case, the plaintext message in lower case and a semi - decoded message, with part of the secret message replaced with periods ( . ) .

**time to launch**

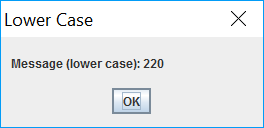
**. . . . . . . . .**

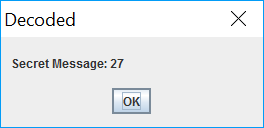
Review the decoding pattern in the starter code and modify the appropriate statements that such that your program will display the message below, without the periods ( . ) .

**time to launch**

**drone BETA**

Also, supplement your program code such that the lengths of the plaintext message and the decoded messages are displayed, such as in the messages boxes that follow.





**Extra Credit: For extra credit, try to create a different secret agent type message from the existing plaintext message or by using your own plaintext message**

**PROJECT Steganography and Secret Messages - Using Arrays in Java**

**Figure 2 Initial Test Run**

|  |
| --- |
|  |

**STEP 7 Submit Your Project**

Once you have determined that your modified program is correctly displaying the secret message, complete the submission process as follows:

Open MS Word and type a heading for a new document that includes your full name, course number, lab number and date.

Within the document paste in a snapshot of your modified code. Label your snapshot of your modified run with a reasonable description.

After your snapshot, paste in your finished source code as well copied in from your NetBeans editor.

Submit your MS Word document to Blackboard when complete.