

CSc 210: Software Development
Section 4: Control Structures in Java
September 25th, 2017

We have been discussing control structures in Java. For this section we will look at some programming problems that require such structures, think of an appropriate approach, and program them up.

Exercise: String Encoder

For this problem you will be writing a program to encode (encrypt) and decode strings. This program can be decomposed easily and made into a short program with several methods. You should pair up with someone sitting next to you to work through this.

The encryption to be performed on a string will have two facets. First, you will have the “encryption key” which is a one byte character you read in. For each character in the string to be encrypted, you should perform a bitwise XOR between the encryption key and that character and add it to the resulting encrypted string (Note: Doing this same operation twice in a row would result in the original character!). If you do not know how to do an XOR, ask your SL or google it! The second part of the encryption will shift the characters down to the right in our string. You will read in an integer “shift amount” and shift all characters in the string down that amount (and wrap around the ones at the end). Once finished, you will print the resulting string.

Here is your first task:

Think about this program with your partner. What are the different tasks it must accomplish? What code could be abstracted into methods? What code could be reused based in both encoding and decoding? How will you decode a string? Try decomposing the problem into smaller ones. Draw a graph of the flow of your program. If you have questions about what it must do, ask your SL.

Now it is time to actually write up the program:

Your program should read in a character ('e' or 'd') telling your program to encode or decode a string. The string to operate on will be read in on the next line. Then another character should be read in which will be the one byte “encryption key”. Finally, you should read in an integer which is a “shift amount.”

Once input is read, you should perform whatever operation was asked and print out the now encoded or decoded string.

Once finished writing your program, ask your SL to take a look at it and get feedback.

That's all folks!