Java Programming Challenge

Overview

Your task is to develop an application that can decode secret messages made up of letters, numbers, and symbols. The encrypted messages will be stored in a text file called 'secret-message.txt'. The file may contain multiple lines, and will have commas separating each encrypted value. For example: 10,c,$,9, ,1,n, ,), ,(,@,9,o

Your application must read the input file, decode the messages, and display the decoded messages. Convert the decoded messages to lower case before displaying the results. Each type of character (letters, numbers, and symbols) will need to be decoded in a different way.

1. Letters

Valid Values: Any lower case letter (a-z) may appear in the secret message.

Decoding Instructions:

1. Shift the letter 5 positions forward in the alphabet (wrap around at "z" if needed)

Example 1:

The letter "o" appears in the encrypted message.

1. Starting at the letter "o" go forward 5 letters in the alphabet, to the letter "t"

Example 2:

The letter "x" appears in the encrypted message.

1. Starting at the letter "x" go forward 5 letters in the alphabet (wrap around to "a" after "z"), to the letter "c"

2. Numbers

Valid values:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Decoding Instructions:

1. For any of the valid values x, calculate $\sqrt{(x + 5000 + (x * 200))}$
2. If the answer is a decimal, round it up to the next integer
3. This will be an ASCII value -- convert it to a letter. The following website has a simple chart of ASCII values and their letters: http://www.kerryr.net/pioneers/ascii2.htm

Example:

The number 4 appears in the encrypted message.

1. $\sqrt{(4 + 5000 + (4 * 200))} = 76.184$
2. Round that value up to 77
3. Convert ASCII value 77 to the letter "m"

3. Symbols

Valid Values:

!	@	#	$	%	^	&	*	(	)

Decoding Instructions:

1. Convert the symbol to the its corresponding number on the keyboard, x
2. Plug that number into the formula: $(11 * x/5 + 97)$
3. If the answer is a decimal, round it down to an integer
4. This will be an ASCII value -- convert it to a letter

Example:

The symbol $ appears in the encrypted message.

1. The $ symbol appears on the 4 key on the keyboard, so x = 4
2. $(11 * 4/5 + 97) = 105.8$
3. Round 105.8 down to 105
4. Convert ASCII value 105 to the letter "i"

4. Spaces

Spaces should be added directly to the decoded message.

Additional Requirements

1. Develop a GUI to accept an encrypted message and show the decoded output to the user. (This could be a command line GUI, a Web page, a Java Swing application, etc.). The user should be able to decode additional messages without having to relaunch your program each time.
2. Allow your application to store results and load previously decoded messages. (You can save the output to a text file, to a database, etc.).
3. Add a feature to your application to accept a plain text message and encrypt the message.
4. Make your application gracefully handle invalid characters that have no decoding instructions.

***** Judging will be based on functionality, code structure, and how easy it is to interact with your system. *****

Sample Data

1. Encoded: #,*,v,5,y, ,8,),&,1,y,9, ,$,n, ,),r,@,9,6,h,@
   Decoded: grand rapids is awesome

2. Encoded: (,c,@, ,7,p,1,x,3, ,w,*,6,12,i, ,a,6,13, ,2,p,4,&,9, ,j,q,@,*, ,10,c,@, ,%,v,15,t, ,y,6,#
   Decoded: the quick brown fox jumps over the lazy dog

3. Encoded: 12,@,%,!,6,4,@, ,(,j, ,(,c,z, ,4,$,y,r,@,9,o, ,!,6,%,g,z,b,1,),(,z, ,!,6,4,k,11,o,1,^,#, ,!,j,i,a,@,*,z,^,!,@
   Decoded: welcome to the midwest collegiate computing conference