Week 2 Practice Problems

1. HOURS

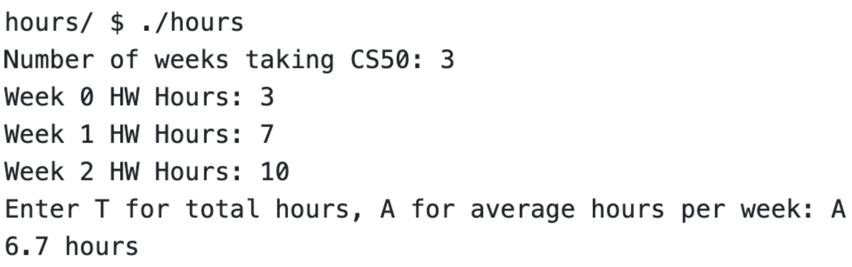
The main function prompts the user for the number of weeks a user has been taking CS50, then creates an array with as many elements.

Notice that, after retrieving some data, the program prompts the user to type in either “T” or “A”—”T” should (but doesn’t yet!) print the total number of hours the user entered, while “A” should (but doesn’t yet!) print the average hours the user entered.

Notice that the do while loop uses toupper to capitalize the letter that’s input before it is saved in the variable output. Then, the printf function calls calc_hours. Note the syntax involved when passing an array to a function.

To complete calc_hours, first total up the hours saved in the array into a new variable. Then, depending on the value of output, return either this sum, or the average number of hours.

✏ Example



```
hours/ $ ./hours
Number of weeks taking CS50: 3
Week 0 HW Hours: 3
Week 1 HW Hours: 7
Week 2 HW Hours: 10
Enter T for total hours, A for average hours per week: A
6.7 hours
```

✏ Understanding the problem

- The hours array have the length of how many week you already take
- In calc_hours function, we need to sum all the hours that array stored (the variable total will save this for us)
- In calc_hours function, we need to check if the user typed in "T" or "A"
  - If the user typed "T", we will return the value of total

    - If the user typed "A", we will return the value of total divided by the weeks

✏ **Steps to solve the problem**

1. Declare a variable total to store the sum of all the elements in the hours array. Initialize it to 0.
2. Use a loop to iterate through the hours array and add each element to total.
3. If output is 'T', return total as the result.
4. If output is 'A', calculate the average by dividing total by weeks and return the result.

2. N0 V0w3ls

In this problem, you will convert a word, which you will input at the command line, to a corresponding word with numbers replacing vowels.

✏ **Understanding the problem**

- Your program must accept a single command-line argument, which will be the word that you want to convert (we might use sys library)
- If your program is executed without any command-line arguments or with more than one command-line argument, your program should print an error message of your choice (with printf) and return from main a value of 1 (which tends to signify an error) immediately.
- Your program must contain a function called replace which takes a string input and returns a string output.
- This function will change the following vowels to numbers: a becomes 6, e becomes 3, i becomes 1, o becomes 0 and u does not change.
- The input parameter for the replace function will be argv[1] and the return value is the converted word.
- The main function will then print the converted word, followed by \n.
- You may want to try using the switch statement in your replace function.

✏ **Steps to solve the problem**

1. Check if we are receiving only two command-line arguments
2. Create the function replace
    a. Create a string array to store the result. The initial value will be input
    b. Iterate through each character in the input string
        i. Convert the character to lower case

        ii. Replace certain vowels with numbers
    c. Return the converted string
3. Call the function replace in the main function and store in a variable
4. Printf the variable of step 3 and add "\n" to go to the next line

3. PASSWORD

Your function will iterate through the password that's supplied to it as an argument.

You must check if the password contains at least:

1. One lower case letter
2. One upper case letter
3. One number
4. One symbol

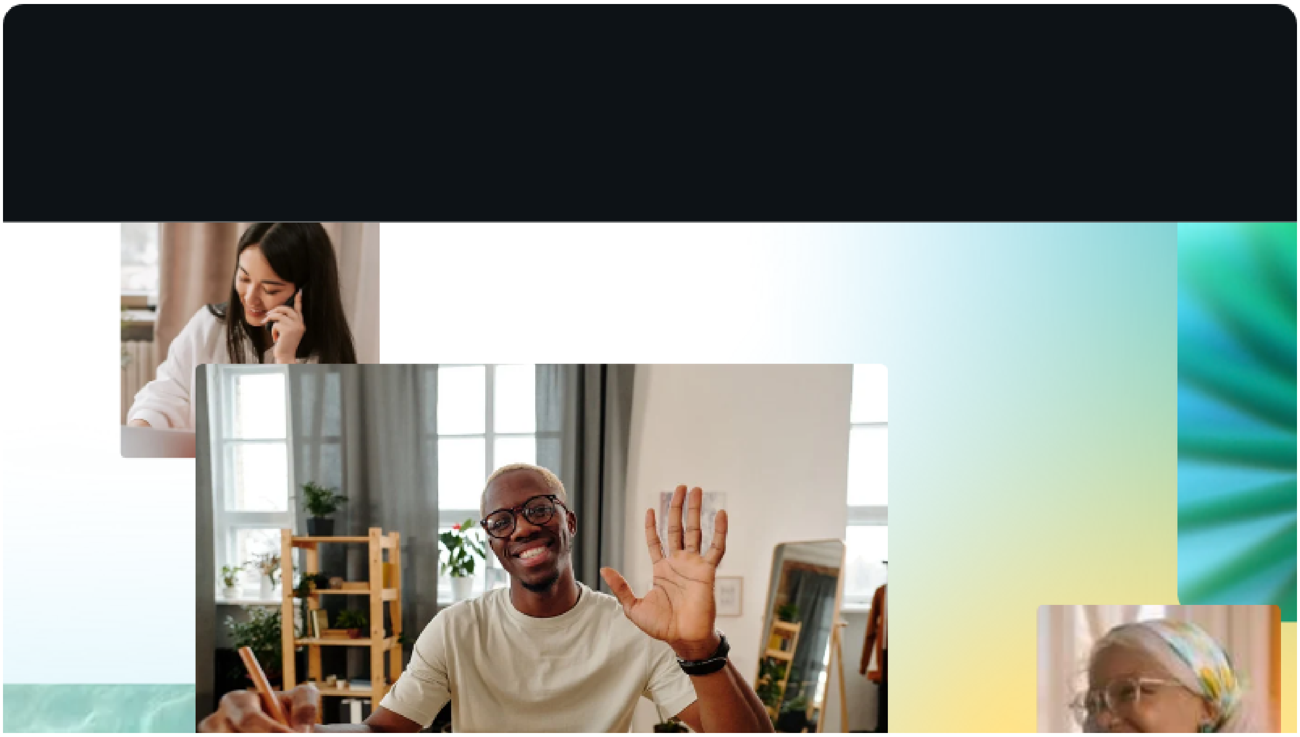
✏ Understanding the problem

Since you have to find at least one lower case letter, one upper case letter, one number and one symbol, you may want to create a boolean variable for each and set each to false before you iterate through the string.

If you then find a number, for instance you can set that boolean to true. If all booleans are true at the end of the function, it means all criteria are met, and you would return true.

✏ Steps to solve the problem

1. Create four variables with value 'false': checkLower, checkUpper, checkNumber and checkSymbol
2. Loop through the string
    a. Check if there is a lower case letter. If so, change the variable checkLower to true (hint)
    b. Check if there is an upper case letter. If so, change the variable checkUpper to true (hint)
    c. Check if there is a number. If so, change the variable checkNumber to true (hint)
    d. Check if there is a symbol. If so, change the variable checkSymbol to true (hint)
3. Check if the four variables are true. If so, return true. Otherwise, return false



Congratulations!

Now you're more than prepared to do the Lab and then the Problem Set!

Good Luck