ECE 175: Computer Programming for Engineering Applications

Homework Assignment 6

Conventions: Name your C programs as *hwx_py.c* where x corresponds to the homework number and y corresponds to the problem number. As an example the C program for hw1 problem 1 should be named as *hw1_p1.c*.

Submission Instructions: Use the dropbox on D2L to submit only the .c files.

1 Distance Converter (20 points)

Develop a C program that receives as input a distance value d in inches and converts it to yards, feet, and inches (1 yard = 3 feet, 1 foot = 12 inches). Your program should:

1. Read the distance value d from the keyboard

2. Use a function called dist_conv to break distance to yards, feet, and inches.

3. Print the result in the main function (not within the dist_conv function)

The dist_conv function prototype should be:

void dist_conv(int d, int *p_y, int *p_f, int *p_i)

Sample Code Execution: **Red text indicates information entered by the user**

```
 Enter the distance in inches: 98

 98 inches equal 2 yards, 2 feet, and 2 inches.
```

2 Array Statistics (20 points)

Write a program that returns the min, max and average value of an array of integers named data_ar. Your program should call a **single** function that returns that mean, max and mean value of the array. The declaration of this function is given below:

void array_processing(int *x, int size, int *min_p, int *max_p, float *mean_p)

/* x is a pointer to the first array element

size is the array size

min_p is a pointer to a var min in the main function that holds the min

max_p is a pointer to a var max in the main function that holds the max

mean_p is a pointer to a var mean in the main function that holds the mean

Declared the array of integers within the main function
int data_ar={$-3, 5, 6, 7, 12, 3, 4, 6, 19, 23, 100, 3, 4, -2, 9, 43, 32, 45, 32, 2, 3, 2, -1$};

3   Doors (20 points)

Consider the following game: There are 100 doors (numbered 1 through 100) and 100 students labeled with ids from 1 to 100 waiting in a line. Initially, all the doors are closed. A student with and id x passes through all the doors that are multiples of x (i.e., student with id x goes to doors labeled with $x, 2x, 3x, ...$) and changes the status of each door, i.e., opens the door if it is closed or closes the door if it is open. After all the students complete their turns, which doors remain open? Write a C program that mimics this experiment and prints the labels of doors that remain open after all students in line have passed through the doors. Moreover, it prints the number of doors that remained open.

For this problem, submit your pseudocode

4   Hangman (20 points)

Write an interactive program that plays a game of hangman. Store the characters of the word to be guessed in an array of type char (you can initialize your character array at declaration). Words are seven letters long. Initially, the program displays the length of the word to be guessed. This is in the form of successive stars (see example). The player guesses letters belonging to the secret word one by one. After each guess, the letters that have been guessed and the number of wrong guesses are displayed on screen. Your program should terminate when either the entire word is guessed or **4 incorrect guesses** have been attempted.

Your program must be modular. Create at least two meaningful functions that abstract details such as printing the word state after a letter guess is attempted or searching for a letter within a word. Test your program for the words: abandon, annoyed, finance, aerobic, inferno, infancy.

Sample execution for word abandon:

```
Hi, let's play hangman. The secret word is:
******
Guess a letter:t
Letter t is not part of the secret word, You have 3 attempts left.
******
Guess a letter:a
Letter a exists 2 times in the secret word, You have 3 attempts left.
a*a****
Guess a letter:e
Letter e is not part of the secret word, you have 2 attempts left.
......
```

For this problem, submit your pseudocode

Submit your .c files named hw6_p1.c, hw6_p2.c, hw6_p3.c, and hw6_p3.c via D2L dropbox