Design document for Assignment 1.

- I included all the libraries at the top that I will need to execute my program.
- I declared all my functions before implementing it so that the OACP knows that the declared functions will be implemented later in the program.
- Within the main, I first initialized an array of characters (ACD variable) with four spots to hold the user input (the three letters that are either “y” or “n” or a mixture of both which represents permissions, and the last character corresponds to the null character.). We know that a char takes 1 byte of memory, so that means that a char array with length 4 will takes 4 bytes of memory which is too big and inefficient. We need to find a better way to store the user input without wasting much memory.
- OACP asks the user to input a sequence of character using printf and grabs whatever the user enters using scanf. There is an error handling I have done if by any chance the user inputs the wrong sequence of letters and the OACP exits if it happens.
- I declared a char variable and initialized it to zero which means that the 8 bits are all set to zero by default.
- I want to store the permissions (“y” or “n”) in a more compact way. I used the idea of bit models that we discussed in class where zero represents “n” and one represents “y”. This will eventually lead me to use up 3 bits of memory and also used one char variable instead of an array of chars. This will minimize memory footprints and efficiency.
- I looped through the character array while using if statement to check each item if it is either “y” or “n”. if it is y, then I will set the ith bit to 1 else I will set the ith bit to 0.
- I called the functions that display the contents of the ACD in
    1. Character format. This function takes in a character variable as a parameter and prints it in character form using %c.
    2. Decimal format: This function takes in a character variable as a parameter and prints it in decimal form using %u.
    3. Binary format: This function takes in a character variable as a parameter. I used an algorithm which converts the casts the variable passed into an int and then perform set of operation on the integer so that it prints out the corresponding binary string with either 0’s 0r 1’s or both.
- I use pow() function in my code which is defined in math.h library which I included on the top. Since we know that math.h brings the declaration of

various functions and not their definitions, you will need to run my program using the following argument “gcc -o asign1 assign1.c -lm” in order to link it with the math library.