HW5

For HW5, you will write a program that will convert a base 10 integer into a different base (base 2 = binary, base 8 = octal, or base 16 = hexadecimal). Prompt the user for an unsigned integer (i.e. not negative) and display a menu (b or B for binary, o or O for octal, h or H for hexadecimal). Depending on the user's choice, do the base conversion and display the result. Continue with this until the user types "stop" to the prompt for an unsigned integer (the word stop should not be case sensitive).

Question: How do I convert a base 10 integer to base *n*?

Answer: Divide the number by base *n* (each time updating the value of the number to be the quotient from the last division), until you get a quotient of zero. Keep track of the remainders. The remainders collected from bottom up (not top down) will be the answer in base *n*.

Example:

What is 108 in base 2?

$108_{10} = ?_2$

108 / 2 = 54 R 0

54 / 2 = 27 R 0

27 / 2 = 13 R 1

13 / 2 = 6 R 1

6 / 2 = 3 R 0

3 / 2 = 1 R 1

1 / 2 = 0 R 1

The answer is 1101100 (notice the answer is not 0011011)

A base 2 number will only have digits 0 and 1. A base 8 number will have digits 0 to 7. A base 16 number needs "digits" 0 to 15. Since we don't have a unique symbol for 10 to 15, we use A for 10, B for 11, C for 12, D for 13, E for 14, and F for 15.

All the logic that does the conversion needs to be written by you. If you use any type of built-in function/method that is designed to take in a number in one base and return it in another base, you will get very little to no credit on this assignment.

Use the sample below as a guide for developing your program and for the format of the prompts and the outputs. Don't add anything extra and create your program to exactly match the specifications given above and in the sample. Your solution should be divided up into functions. No function should have more than 15 lines of code. The `main` can be longer, but still should be no more than 40 lines. Comments don't count as line numbers. In the sample run, the user input is shown in bold so you can easily distinguish input from program generated text (it does not have to show up as bold in your program).

Sample run

```
This program will convert a base 10 number into another base
Enter an unsigned integer: hello
Enter an unsigned integer: 5.6
Enter an unsigned integer: 108
B for binary, O for octal, H for hexadecimal: B
1101100
------------------
Enter an unsigned integer: #$%
Enter an unsigned integer: -10
Enter an unsigned integer: 725
B for binary, O for octal, H for hexadecimal: b
1011010101
------------------
Enter an unsigned integer: 825
B for binary, O for octal, H for hexadecimal: hello
Invalid choice!
B for binary, O for octal, H for hexadecimal: 5.6
Invalid choice!
B for binary, O for octal, H for hexadecimal: o
1471
------------------
Enter an unsigned integer: 540
B for binary, O for octal, H for hexadecimal: h
```

```
21C
------------------
Enter an unsigned integer: 12345
B for binary, O for octal, H for hexadecimal: H
3039
------------------
Enter an unsigned integer: 703710
B for binary, O for octal, H for hexadecimal: h
ABCDE
------------------
Enter an unsigned integer: -3877
Enter an unsigned integer: 3877
B for binary, O for octal, H for hexadecimal: h
F25
------------------
Enter an unsigned integer: 1000
B for binary, O for octal, H for hexadecimal: O
1750
------------------
Enter an unsigned integer: Stop
Thank you for using this program
```

When you've finished your homework, use the submit command to submit the file.

You must be logged into your account and you must be in the same directory as the file you're trying to submit.

At the Linux prompt, type

```
submit cs201 HW5 hw5.py
```

After entering the submit command shown above, you should get a confirmation that submit worked correctly:

```
Submitting hw5.py...OK
```

If not, check your spelling and that you have included each of the required parts and try again.

You can check your submission by entering:

```
submitls cs201 HW5
```

You should see the name of the file that you just submitted, in this case hw5.py