Python Review: Conditional Repetition, Input Validation

Answer the following questions.

1. Explain why the code below might cause a run-time error. Rewrite the code so that it does not.

```
n = int(input("Please enter an integer: "))
if n > 0:
   print("Your integer is positive.")
```

2. Explain why the code below does not work as intended, then correct it so that it does.

```
# Count down from 10 to 1
x = 10
while x > 0:
   print(x)
```

Write programs that accomplish each task. Use proper conventions for variable names, input prompts, output statements, and program structure. Do not assume that the user will enter the correct data type. Check the user's input, and ensure that they enter appropriate values.

3. Read two positive integers, *a* and *b*, from the user, then determine the quotient and remainder when *a* is divided by *b*. For example, when *a* = 23 and *b* = 5, the quotient is 4 and the remainder is 3. Ensure that your program handles the case when *b* = 0.

4. Generate random letters from A-F until two of the same letter are generated in a row. Count the number of letters that were generated.

5. Beginning at (0, 0) on the Cartesian plane, the user enters one of four cardinal directions (NEWS) to move to a new point, e.g. typing "N" moves the user to (0, 1). Generate a random pair of integer coordinates, (*m*, *n*) where *m* and *n* are between -5 and 5 inclusive, and have the user move around the plane until they are at the random location. Count the number of moves made.

6. A game is played in which a six-sided die is rolled repeatedly. Beginning at zero, the player scores a number of points equal to the roll, unless a six is rolled, in which case the player's score is reset to zero. Upon reaching 25 points or more, the game ends and the player is assigned a score equal to the number of rolls made. Lower scores are better. For example, the following game results in a final score of 15: 5, 1, 3, 6 (reset), 2, 4, 6 (reset), 3, 3, 5, 1, 3, 5, 4, 2.

7. Read a positive integer from the user, and express it as the product of its prime factors. For example, 42 = 2 x 3 x 7, while 24 = 2 x 2 x 2 x 3.