IS 640 Midterm 1

There are three questions in this exam. Please use q1.py, q2.py and q3.py as your file names for the three questions. Tips and rules for taking the exam:

- Design first, you should know how to do it in English and break the tasks into small steps.
- Work incrementally, code one step at a time, and test the step.
- Use VS Code as your editor. It helps you fix syntax errors.
- Run the code before submission. If the code doesn't run, i.e., has syntax error, the highest credit is 20% of the question credit.
- You can use your book and Internet to search help and check syntax. Don't ask a live person.
- When you complete one question, please submit the file to Canvas. You can submit a file multiple times but only the last version of q1.py, q2.py and q3.py are used.
- *Any cheat such as copying code from another person, will fail this course.*

Question 1 (50 points for q1.py)

Please write a program that use a loop and the built-in function ***chr(number)*** to draw the following pattern.

- Define and use the ROWS = 26 constant to draw the pattern for 26 rows.
- Tip: chr(97) is letter "a", chr(98) is letter "b", and so on so forth.
- It starts with number 1 and letter "a", then both the row number and letter increases by one position.
- There a space after the line number, followed by several stars and letters that each repeats the row number.
- For example
    - line 1 has 1 star and 1 letter "a"
    - line 2 has 2 stars and 2 letters of "b"
    - line 3 has 3 stars and 3 letters of "c"
    - the pattern repeats till line 26 that has 26 stars and 26 "z"

Following is the sample output:

1 *a
2 **bb
3 ***ccc
4 ****dddd
… *(omitted lines, your program should draw all lines)*
26 **********zzzzzzzzzzzzzzzzzzzzzzzzzz

Question 2 (50 points for q2.py)

The following table is shipping charges of a logistic company.

Weight	Rate Per Pound
First 3kg (include 3kg)	$2.75
Over 3kg but not more than 7kg	$3.00
Over 7kg but not more than 15kg	$3.17
Over 15kg	$3.70

For example
- a 4kg package costs 3 * $2.75 + 1 * $3.00 = $11.25.
- a 13kg package costs 3 * $2.75 + 4 * $3.00 + 6 * $3.17 = $39.27.

Write a program performing the following tasks:
1) uses the random module and set its seed to 2023.
2) generates 10 random numbers between 1 and 20 (inclusive).
3) calculates and prints the shipping price for each random number. The price should have two decimal points.

The following are the output of the first two lines and the last line. There are 10 lines in your output.

The shipping price for a 13kg package is $39.27
The shipping price for a 15kg package is $45.61
…
The shipping price for a 10kg package is $29.76

Question 3 (50 points for q3.py)

Please set the random seed to 2023, then use the Turtle graphic module to draw the following picture:

- (20 points) Draw X-axis and Y-axis with length of 1000 (each side is 500).
- (20 points) Repeat 30 times, each time draw a circle that
  - centers are in the (0, 0)
  - the first radius is 50, then each loop increases the radisus by 10
  - then uses a random color from the list (don't change it) of ***COLORS = ["beige", "coral", "gold", "blue", "green***"]. Please use ***random.randint*** function to generate a valid random index to the list of colors.
- (10 points) draw a square that encloses and touches the outmost circle in RED color.

The final picture will look like the following: