Exercise 1

Problem 1 to 8 should be done in a file named ex1_p1_8.py. Use Python's comments to separate the code in each problem

1. Define a constant 5280 feet in a mile and a variable, miles, with a value of 13 assigned to it. Then, write an assignment statement that calculates and prints the number of feet in 13 miles.

```
FEET_IN_MILE = 5280
miles = 13
feet = FEET_IN_MILE * miles
print(feet)
```

2. Define variables `hours`, `minutes` and `seconds`; assign values of 7, 21, and 37, respectively, to each of those variables. Then, write an assignment statement that updates the variable seconds to have a value corresponding to the total number of seconds.

3. Define variables `width` and `height`; assigns values of 4 and 7 to each of those variables, respectively. Then, write a Python statement that calculates and prints the length of the perimeter of a rectangle. The perimeter of a rectangle is 2*width + 2*height.

4. Pre-defines the constant `PI` and the variable `radius` corresponding to the radius of a circle in inches, write an assignment statement that defines a variable `area` whose value is the area of a circle with radius `radius` in square inches. Print out the area of a circle with radius 8.

5. Pre-defined variables `present_value`, `annual_rate` and `years`, write an assignment statement that define a variable `future_value` whose value is `present_value` dollars invested at `annual_rate` percent interest, compounded annually for `years`. The future_value is given by the formulas
$present\_value*(1+0.01*annual\_rate)^{years}$.

6. The distance between two points $(x0,y0)$ $(x1,y1)$ is $\sqrt{((x0-x1)^2+(y0-y1)^2)}$. Pre-define the variables `x0`, `y0`, `x1`, and `y1`, write an assignment statement that defines a variable `distance` whose values is the distance between the points $(x0,y0)$ and $(x1,y1)$. Calculate and print the distance between the points $(2,2)$ and $(5,6)$.

7. Heron's formula states the area of a triangle is $\sqrt{s(s-a)(s-b)(s-c)}$ where a, b and c are the lengths of the sides of the triangle and $s = 0.5(a+b+c)$ is the *semi-perimeter* of the triangle. Given the variables `x0`, `y0`, `x1`, `y1`, `x2`, and `y2`, write a Python program that computes a variable `area` whose value is the area of the triangle with vertices $(x0, y0)$, $(x1, y1)$ and $(x2, y2)$. Calculate and print the area of a triangle whose vertices are (1, 1), (4, 1), and (4, 5).

8. Ask a user to enter the desired amount of coffee, in cups. Given this, you can adjust the program by calculating how much water, coffee, and milk are necessary to make the specified amount of coffee. Note that one cup of coffee made on this coffee machine contains 200 ml of water, 50 ml of milk, and 15 g of coffee beans.

Examples

The greater-than symbol followed by space (`>`) represents the user input. Notice that it's not the part of the input.

Example 1: *a dialogue with a user might look like this*

```
1   Write how many cups of coffee you will need:
2   > 25
3   For 25 cups of coffee you will need:
4   5000 ml of water
5   1250 ml of milk
6   375 g of coffee beans
```

Example 2: *here is another dialogue*

```
1   Write how many cups of coffee you will need:
2   > 125
3   For 125 cups of coffee you will need:
4   25000 ml of water
5   6250 ml of milk
6   1875 g of coffee beans
```

Problem 9 to 10 should be done in a file named ex1_p9.py and ex1_p10.py, respectively.

9. Study the code in turtle_graphic_intro.py and see if you can draw the following pictures using Python's Turtle graphic?
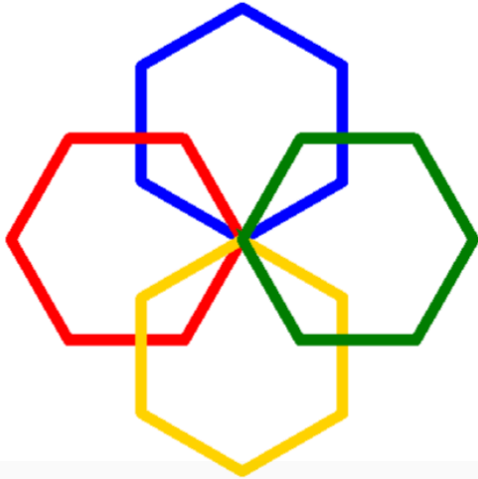
10. Study the code in ascii_arts.py; you have not learned about list and indexes in Python yet, but this exercise gives you a glimpse of what is possible with list in Python. Run this program and see if you can figure out how it works.

Goto https://www.asciiart.eu

Select three of your favorite categories (for example, Books, Computers, and Movies). For each category, create a list of five items. Your program will first ask the user to provide a number to select a category. Then, it will ask for another number to select an item in that category.

Here is a sample output:

```
Enter a number to select a category (0 - Animal, 1-Movies, 2-Logos): > 2
Enter a number from 0 to 5 to see an ascii Logos: > 1
```
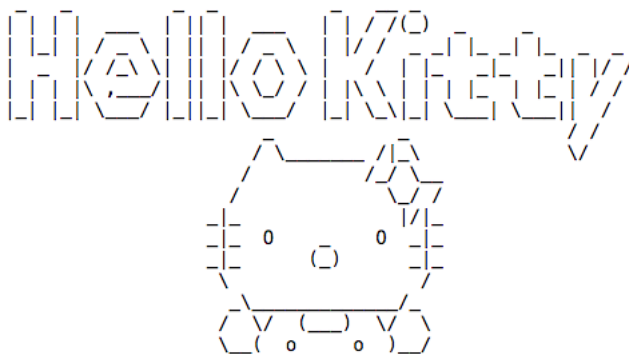
```
You have selected to view Logos of Hello Kitty
```

Submission:
- ***Create StudentID_Firstname_ex1 folder, where StudentID is your KU ID and Firstname is your given name***
- ***Put the files to submit, ex1_p1_8.py, ex1_p9, and ex1_p10, into this folder***
- ***Zip the folder and submit the zip file to the course's Google Classroom before the due date***

Grading:
1. Correctness (50%); your code must run and produce correct outcomes; code that does not run because of, for example, syntax errors or name misspelling receives zero credit.
2. Cleanliness (50%): your code must be clean, following PEP 8 style guide; variable names must be meaningful, following PEP 8 convention; comments must be put in for others to be able to read and understand your code, again following PEP 8 convention. For this exercise, which involves relatively simple and short programs, extensive comments may not be necessary.