Practical 3 Exercise

1. Translate the following statements into frames. Then code the frames (class and instance) using Python.

Animal is-a class.
Pet is-a animal. Pet has-a name.
Dog is-a pet. Cat is-a pet.
Garfield is-a cat. Pluto is-a dog.
Person is-a animal. Person has-a name.
Student is-a Person. Student has-a student id.
John is-a student. His id is “TARUC1”.

2. Time is a class. Time has the attributes of *hour*, *minute* and *second*. The default values of the attributes are zero (0), but the constructor of the class allows the hour, minute and second to be set by the user when an instance is created. Time has a method called tick(), which will increase the *second* by 1 each time it is executed. Therefore after 10,000 iterations of tick(), the “*hour*” attribute will increase by 2, the “*minute*” will increase by 46, and the “*second*” will increase by 40. Hence, printing the Time instance after 10,000 iterations of tick() will display 2:46:40 on the screen if all the attributes of *hour*, *minute* and *second* are not set. On the other side, if the attributes are set as 13 hours, 20 minutes and 5 seconds when the instance is created, then printing the Time instance after 10,000 iterations of tick() will result in 16:6:45 displayed on the screen.
3. Date is a class. Date has the attributes of day, month and year. Each month has either 30 or 31 days, except that February has 28 days in general. Date has a method called advance(), which will increase the day by 1 each time it is executed. Therefore after 1000 iterations of advance(), without considering the leap year, the year will increase by 2 (i.e. 730 days), and the month will increase by 8 (i.e. 243 days), and the day will increase by 27. Hence, printing the Date instance after 1000 iterations of advance() will display 27/8/2 (2 years 8 months 27 days) on the screen, if the attributes of day, month and year are not set. However, if the attributes are set as 1 day, 7 month and 2016 year when the instance is created, then printing the Date instance after 1000 iterations of advance() will display 28/3/2019 on the screen.
4. Referring to Question 2 and Question 3, DateTime is a subclass that is derived from Date and Time classes. DateTime allows the user to set the day, month, year, hours, minutes and seconds. DateTime inherits both tick() and advance() methods from the parent classes.

   Assume that you would like to create a DateTime object called startDate. Set the StartDate as 1st July of the current year. The duration of the assignment is 2 weeks (14 days) and 17.5 hours (63,000 seconds). Perform the advance() and tick() methods with necessary number of iterations. Then display the final results on the screen.

Reference:

https://docs.python.org/3.7/tutorial/classes.html#inheritance