Midterm Exam Part 2 (level-2) – A Hand-on Exam to implement different requirements
50 points
Due (via your git repo) no later than 4:40 p.m., Wednesday, 31st March 2021.

Part A (25 points):

The key focus is to test your understanding on Computational Constructs and List Data Structure.

1. For simplicity, a starter code using the file named `dslist2.py` is provided in the exam repository. The starter code is incomplete. You are required to complete the implementation.
2. The starter code automatically fills out a list with a random set of values. The size of the list is random as well.
3. Identify the midpoint in the forward and reverse the direction of the input list. The implementation for this part should be done by completing the code in the **reverse_data** and **findMid** methods. The details on the implementation of these individual methods are provided in the comments section of the code.
4. Identify the total number of odd and even numbers in the list. The implementation for this part should be done by completing the code in the evenNos and oddNos methods.
5. Once implementation complete, executing the modified starter-code should correctly print the list, forward midpoint, reverse midpoint, the total count of odd nos, and even nos in the list. Note: Input list will change every time code is executed.
6. An example output is displayed below for your reference:

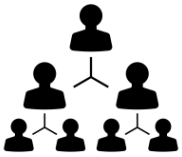
```
amohan@amohanmacpro midterm-test % python3 dslist2.py
input list: [15, 12, 11, 89, 90, 91, 93]
forward mid point: 89
reverse mid point: 89
count of odd nos: 5
count of even nos: 2
amohan@amohanmacpro midterm-test %
```

```
amohan@amohanmacpro midterm-test % python3 dslist2.py
input list: [15, 12, 11, 89, 90, 91, 93, 94]
forward mid point: 90
reverse mid point: 89
count of odd nos: 5
count of even nos: 3
amohan@amohanmacpro midterm-test %
```

PS next page.

Part B (25 points):

The key focus is to test your understanding on Inheritance and Abstract Classes.



1. For simplicity, a starter code using the file named `worker.py` is provided in the exam repository. The starter code is incomplete. You are required to complete the implementation.
2. Create an abstract class called worker in the worker.py file.
3. Create an abstract method in the class worker called duty.
4. Create a non-abstract method in the class worker called greet.
5. Create four different workers namely: doctor, attorney, carpenter, programmer. These four workers should be implemented in their own individual classes inheriting the worker class. Implement all these classes in the worker.py file. Please note, I don't require you to create any additional .py file. All the implementation should be completed within the worker.py file.
6. Implement the duty method differently for different workers. For example:

   A **doctor** should print:

   ```
   I diagnose and treat medical conditions.
   ```

   An **attorney** should print:

   ```
   I advise and represent the legal rights of my clients.
   ```

   Carpenter should print:

   ```
   I construct, repair, and install building frameworks and structures.
   ```

   Programmer should print:

   ```
   I write code for computer programs and applications.
   ```

7. Implement the greet method with one parameter called type in the worker class. The greet method should then print a message based on the corresponding type. For example: **"I am a doctor"**
8. The above said greet method should be called from all the sub-classes. The method should be calling using the corresponding worker type. These calls should be implemented in the duty method. That is, before printing the duties for the individual worker, make a call to the greet method. The greeting message should be printed first. Next, the corresponding worker's duties should be printed.
9. Instantiate four objects for the four sub-classes in the worker.py file. Make a call to the duty method by using the four objects that are instantiated.

PS next page.

10. An example output is shown below for your reference:

```
amohan@amohanmacpro midterm-test % python3 worker.py
Hello, I am a Doctor:
        I diagnose and treat medical conditions.
Hello, I am an Attorney:
        I advise and represent the legal rights of my clients.
Hello, I am a Carpenter:
        I construct, repair, and install building frameworks and structures.
Hello, I am a Programmer:
        I write code for computer programs and applications.
amohan@amohanmacpro midterm-test %
```

To wrap up:

- Make edits to the honor-code.txt file. Here, read through the honor code statement and sign by replacing Student Name with your name. The honor-code is required to be signed for the work to be graded.
- Thanks for completing this exam. Share your experience about this exam by listing out your points and answering the questions in the reflections.txt file.

Submission Details

For this part of the exam, please submit the following to your GitHub repository by using the link shared to you by the Professor:

1. `dslist2.py` and `worker.py`.
2. A document to reflect your experience in this exam in a file named `reflections.txt`.
3. A document with the honor code pledge signed in a file named `honor-code.txt` document.
4. It is highly important, for you to meet the honor code standards provided by the college and to ensure that the submission is completed before the deadline. The honor code policy can be accessed through the course syllabus.