To your surprise, your robot is participating in the 2016 Olympic Games! However, although summer is rapidly approaching, your robot has yet to train for its events. This is where you come in! To ensure that your robot doesn't bring dishonor on its family, you must help it prepare for the upcoming games. You also need to make sure that your robot knows how to properly sing its national anthem, in case it wins a gold medal. You can find a reference to Myro functions that will help you and your little robot to learn how to perform its events and play its song here: http://calicoproject.org/Calico_Myro

Part 1: Going for Gold! (30 Points)

I hope you're ready to hit the ground running! Your task is to train your robot in **2 different events**. Each of these should last for **at least 10 seconds**.

Here are some sample event descriptions, but you can make up your own events:

- Relay race: Your robot should move in a circle (not just rotation) as if running around a track. After completing one full circle, it should wait until an object is placed behind it (hint: IR sensors) before completing another lap, as if it is waiting for a baton pass

- Trap Shooting: Your robot should emit a loud beep and move slightly backwards when an object is placed in front of it (simulating the robot firing at a clay pigeon). Note that this should be able to occur multiple times in a row
- Tennis: Your robot should follow an object that it detects with its sensors (hint: you're going to have to use both the right and left sensors) as if it is chasing a tennis ball

These are just some of the events you can do; feel free to create your own. Try to include comments that specify what the event is intended to be, and ensure that your robot **does something more than move forward,** and that each of the event functions **uses one of the robots sensors**. You are allowed (and encouraged) to make your own helper functions that contain individual actions. Also be sure to place your events into their own functions, called **firstEvent()** and **secondEvent()**.

In addition to the two events, you need to help your robot to learn its national anthem (You may make one up for your robots fictitious 'nation') using the beep() function to create different tones. You are encouraged to make a helper function for this song as well. The song must last for **at least 15 seconds with a minimum of 5 unique notes/tones used**. Once you have created your song, create a **victoryLap()** function that plays the national anthem, and then has your robot perform a signature celebration dance (should last **at least 10 seconds**…Get creative!). Your robot does not need to recite its song and dance at the same time, but kudos to you if you make that work! When you have finished, save the python script with your functions into a file called hw5.py. You will have points taken off if your function and/or file are not named correctly.

Part 2: Write Menu (50 Points)

Now that your robot has completed its training, it is time for it to go to the Olympics! Write a menu function called **olympicsMenu()** that will allow the user to select which event your robot will perform, or whether it should celebrate its victory. You should have it so that when the user inputs 1, the robot does the firstEvent(), when they input 2 the robot does the secondEvent(), and for 3 the robot runs the victoryLap() function. You will need to use conditionals ("if" statements) and a while loop to create a menu that gives the user **3 different options for which action it performs and an option to exit the program**. If the user **inputs an incorrect choice**, **print** the appropriate message ("I'm sorry, that is not a valid choice.") and prompt the user for input **again**.

Whenever the user decides to exit the program (i.e. inputs 4) then have it **print** "Great Work!" To make things a little more interesting, your function also needs to record every correct input into a list, so that when the user tells the function to exit, it will **print out a report of the robot's actions**. This report doesn't need to be extremely detailed; you can simply print out a single line for each time the robot completed one of its actions (event or song/celebration). Note that the list that you create should **NOT contain data about incorrect user input**.

SAMPLE INPUT:

Here is how olympicsMenu() might work:

```
1  Relay Race
2  Tennis
3  Victory!
4  Exit
Which option would you like? 2
```

(The robot performs the secondEvent() function. The program doesn't show the menu until the robot finishes moving and/or beeping)

```
1   Relay Race
2   Tennis
3   Victory!
4   Exit
Which option would you like? 5
I'm sorry, that is not a valid choice.
```

```
1. Relay Race
2. Tennis
3. Victory!
4. Exit
Which option would you like? 1
```

(The robot performs the firstEvent() function. The program doesn't show the menu until the robot finishes moving and/or beeping)

```
1   Relay Race
2   Tennis
3   Victory!
4   Exit
Which option would you like? 3
```

(The robot performs the victoryLap() function. The program doesn't show the menu until the robot finishes moving and/or beeping)

```
1. Relay Race
2. Tennis
3. Victory!
4. Exit
Which option would you like? 4
Great Work!

Your robot won an intense tennis match
Your robot won the relay race
Your robot won a Gold Medal and celebrates its victory!
```

To top it all off, your function should record each action it performs into a file called **replay.txt**

Each line of this file should contain a **single number** which corresponds to the function that was called by the olympicsMenu(). To elaborate, a 1 in the file should relate to the firstEvent() function, a 2 to the secondEvent() function, and a 3 to the victoryLap() function. This is what the replay.txt file for the example above should look like:
```
2
1
3
```

Part 3: Instant Replay! (20 Points)

While it's nice watching the Olympics live, don't you wish you could watch the events again at a later date? For this part of the assignment, you need to create a function called **instantReplay()** which takes in a file name (i.e. "replay.txt") as a parameter. This function should open the file, and run the function that corresponds to each line of the file in order (see above for details). For example, if the replay.txt file from the sample above was passed into instantReplay(), the function should first call secondEvent(), then firstEvent(), and then the victoryLap().
Things of note:
- The file passed into instantReplay() will only have lines that contain either a 1, 2, or 3 (matching the format of the replay.txt file that you created in the previous part)
- The instantReplay() function does not need to print or return anything
- The file passed into the function will not have a set number of lines (so you should probably use a loop to iterate through each line… just saying)

Part 4: Turning it in

Once you are done, submit hw5.py to T-Square. Remember, if there are serious errors in a part of the homework, you will lose credit for that particular part. However, *if your file completely fails to run, it will not be graded and will receive an automatic zero*. Please test your code thoroughly before turning it in!

Rubric:
Part 1: Going for Gold! (30 Points)
- Functions named correctly (firstEvent, secondEvent, victoryLap)   **5 Points**
- Each event is at least 10 seconds and uses one of the robot's sensors   **10 Points**
- The victoryLap function performs the national anthem then executes a celebratory dance
                                                                             1**0 Points**
- National anthem is at least 15 seconds with at least 5 different beeps   **5 Points**

Part 2: Write Menu (50 Points)
- Function named correctly (olympicsMenu)   **5 Points**
- Displays a menu with options   **5 Points**
- Accepts input from the user   **5 Points**
- Loops and exits correctly   **5 Points**

- Correctly prints out summary of robot movement **10 Points**
- Handles cases correctly with conditionals **10 Points**
- Correctly writes movement summary to replay.txt **10 Points**

Part 3: Instant Replay! (20 Points)
- Function named correctly (instantReplay) **5 Points**
- Correctly reads data from the argument file name **10 Points**
- Calls each function that corresponds to the data from the file **5 Points**

You can earn up to 3 points bonus [discretion of the TAs] for extra creativity/general awesomeness, for a possible total of 103/100.