**18.12.2015**

**Due date: 23.12.2015, 23:55**

**CENG113 - Programming Basics**

**HOMEWORK #7 – The Avengers Prom**

Write a "Marvel Date Matching" in Python. You will be given two files of Male Marvel Characters and Female Marvel Characters. The files include characters and their preferences for the prom. The preferences of high priority are given by their order.

**Example #1:**

**Hulk:** Jean Grey, Ms. Marvel, Invisible Woman, Rouge, Elektra, Mystique, Scarlet Witch, Black Widow, Gamora, Storm

"Hulk" **highly prefers** "Jean Grey" and **lowly prefers** "Storm" as his prom date.

The prom's capacity is 10 people. Therefore, only 5 male Marvel characters and 5 female Marvel characters should be invited to the prom. The invitations should be sent randomly.

The file contains 10 preferences of Marvel characters, however only 5 of his/her preferences will exist in the prom. The preference list should be updated by removing the characters whom are not invited to the prom.

**Example #2:**

**Invited Males:** Hulk, Iron Man, Thor, Captain America, Wolverine

**Invited Females:** Storm, Ms. Marvel, Jean Grey, Elektra, Gamora

**Original Hulk Preference List:** Jean Grey, Ms. Marvel, Invisible Woman, Rouge, Elektra, Mystique, Scarlet Witch, Black Widow, Gamora, Storm

**Updated Hulk Preference List:** Jean Grey, Ms. Marvel, Elektra, Gamora, Storm

In this scenario, male Marvel characters propose the female Marvel characters to be his date. According to their preferences female Marvel characters can either reject or accept the propositions. If a female Marvel character has already accepted proposition from her highest preference, this character will not accept any other propositions. If she gets a better proposition, she rejects her current date and accepts new coming proposition. For the rejected male Marvel character, proposes his next preference. In some steps of the algorithm, it is possible for female Marvel characters may not receive any proposition. Your algorithm should work as below;

**Example #3:**

**Before propositions.**

| Hulk | Iron Man | Thor |
|---|---|---|
| Jean Grey | Jean Grey | Ms. Marvel |
| Ms. Marvel | Ms. Marvel | Storm |
| Storm | Strom | Jean Grey |

| Storm | Ms. Marvel | Jean Grey |
|---|---|---|
| Iron Man | Iron Man | Hulk |
| Thor | Thor | Iron Man |
| Hulk | Hulk | Thor |

**DAY 1 (All male characters propose their first preferences):**

| Hulk | Iron Man | Thor |
|---|---|---|
| Jean Grey | Jean Grey | Ms. Marvel |
| Ms. Marvel | Ms. Marvel | Storm |
| Storm | Strom | Jean Grey |

| Storm | Ms. Marvel | Jean Grey |
|---|---|---|
| Iron Man | Iron Man | Hulk |
| Thor | Thor | Iron Man |
| Hulk | Hulk | Thor |

**Proposes:**

Jean Grey: 2

Ms. Marvel: 1

**Matches:**

- Hulk – Jean Grey
- Iron Man – REJECTED by Jean Grey
- Thor – Ms. Marvel

**DAY 2 (New proposition from rejected male characters):**

| Hulk | Iron Man | Thor |
|---|---|---|
| Jean Grey | Jean Grey | Ms. Marvel |
| Ms. Marvel | Ms. Marvel | Storm |
| Storm | Strom | Jean Grey |

| Storm | Ms. Marvel | Jean Grey |
|---|---|---|
| Iron Man | Iron Man | Hulk |
| Thor | Thor | Iron Man |
| Hulk | Hulk | Thor |

**Proposes:**

Ms. Marvel: 1

**Matches:**

- Hulk – Jean Grey
- Iron Man – Ms. Marvel
- Thor – REJECTED by Ms. Marvel

**DAY 3 (New proposition from rejected male characters):**

| Hulk | Iron Man | Thor |
|---|---|---|
| Jean Grey | Jean Grey | Ms. Marvel |
| Ms. Marvel | Ms. Marvel | Storm |
| Storm | Strom | Jean Grey |

| Storm | Ms. Marvel | Jean Grey |
|---|---|---|
| Iron Man | Iron Man | Hulk |
| Thor | Thor | Iron Man |
| Hulk | Hulk | Thor |

**Proposes:**

Storm: 1

**Matches:**

- Hulk – Jean Grey
- Iron Man – Ms. Marvel
- Thor – Storm

Best date preferences are complete. All male Marvel characters have found their date for prom. Since there will be no more proposes, the algorithm ends. Do not forget, this example does not mean the algorithm should end at 3 days. The necessary functions are given below.

**Function 1:** This function is responsible of reading the "women_heroes.txt" and "men_heroes.txt" files and randomly selects 5 different heroes from each.

**Function 2:** This function should update the Marvel heroes' preference list, according to the invited Marvel heroes. (See **Example #2**)

**Function 3:** This function will perform the matching (proposition/rejection) process. However, it **important** that you implement this **function recursively**. Iteratively implementations will **NOT BE ACCEPTED**. (See **Example #3**)

**Submission Rules:**

1. You should submit your codes through CMS.
2. Your homework should be named as **HW7_StudentID.py**. Students who do NOT follow these rules **WILL BE GRADED AS 0**.
3. Use comments in your code, otherwise you will lose some points.
4. Write your Name, Surname and Student ID as a comment in your code.