Bonus Requirements

[I] Device Failure (6%)

A device (E or U) may stop working and require maintenance to work again. Each device has its own maintenance time.

Failure Cases

Case1: Free Failure (2%)

This occurs when a device that is not assigned to a patient fails. The probability of failure ***PFreeFail*** should be loaded from the input file

Discovery:

The failure is discovered when trying to assign that free device to a patient. At that timestep, generate a random number and if it is less than ***PFreeFail***, consider the device as a failed device.

Handling:

- Don't assign the failed device to the patient
- Move the device to the device maintenance list.
- Once the maintenance is done, move the device back to the available list.

Modifications

- Modify the input file and add PFreeFail and maintenance time for each device
- Modify the output file and add the percentage of free devices that failed
- Add a new list/lists for the devices maintenance
- Update the output screen to print the maintenance list
- Make any other necessary modifications after consulting your project supervisor

Case2: Busy Failure (4%)

This occurs when a device that is already assigned to a patient fails. The probability of failure ***PBusyFail*** should be loaded from the input file

Discovery:

At that timestep, generate a random number and if it is less than ***PBusyFail*** then pick a patient randomly from in_Treatement list and consider it as interrupted patient (IP) and the device serving his as a failed device.

Handling:

- The patient to interrupt must be encountering E_ or U_treatment only. This is not applicable for X_treatment patients. If the randomly picked patient is X_Treating, search for another one.
- Move the patient to Interrupted patients List

- Modify the patient treatment time for that device type = the remaining time to end treatment.
- Move the device to the device maintenance list.
- Once the maintenance is done, move the device back to the available list.
- At each timestep, the patients in the interrupted List have the **highest priority** to be assigned to a device before any other waiting patients.

Modifications

- Modify the input file and add PBusyFail and maintenance time for each device
- Modify the output file and add the percentage of busy devices that failed
- Add a new list/lists for the devices maintenance
- Add a new list/lists for the interrupted patients
- Modify the In_Treatment list as needed.
- Update the output screen to print the maintenance and interrupted lists
- Make any other necessary modifications after consulting your project supervisor

[II] X-therapy: more requirements (4%)

- Assume we have 3 types of gym tools in the center.
- For each x-therapy for a patient, identify the tools (max 3) a patient needs in the gym room.
- Each room should have some available tools.
- The patient can work on gym tools in any order
- To assign a patient to a room, the corresponding tool should be available.

Modifications

- Modify the input file
    - add the tools available in each room
    - For each patient with X-therapy, add the
    - tools and duration of each.
- Add 3 lists in the room for available tools
- May need to split the X_Waiting list to 3 lists; one for each tool type.
- Make any other necessary modifications after consulting your project supervisor