This folder contains all of the data, code, and requirements necessary to run the Hershey OR Sim model on Python 3.8. Other versions of Python might work too.

Running the code

Option 1: Without using a virtual environment.

1. Download both data sets, ORSim.py, run_model.py, and requirements.txt into a new folder on your computer
2. Navigate to that folder in the command prompt
3. Type and run the following command in the command prompt: `pip install -r requirements.txt --user` to install package requirements
4. Type and run the following command in the command prompt: `python run_model.py` to run the model

Option 2: Using a virtual environment

1. Download Python 3.8.x (Python 3.8.3 was used in testing)
2. Create a virtual environment on your computer
    i. Create a folder on your computer called "new_folder"
    ii. Open the command prompt and navigate into the folder
    iii. Type and run the following command once you are in the folder in the command prompt: `py -m venv env`
    iv. Type and run the following command: `.\env\Scripts\activate`
    v. Additional instructions on setting up the virtual environment can be found here: https://packaging.python.org/guides/installing-using-pip-and-virtual-environments/
3. Move both data sets, ORSim.py, run_model.py, and requirements.txt into "new_folder"
4. Type and run the following command in the command prompt: `pip install -r requirements.txt --user`
5. Type and run the following command in the command prompt: `python run_model.py` to run the model

Functions and Examples

run_model.py contains examples on how to run each of the main functions from the run_model.py file. The functions are also described below.

HersheyORSim class

The HersheyORSim class is the base class that controls most of the model's function.

Parameters

- `selected_month` can be any of Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec (default is Jan)
- `selected_weekday` can be any of Sun, Mon, Tue, Wed, Thu, Fri, Sat, Sun (default is Mon)
- `selected_cutoff_time` can be any float. This parameter refers to when the planned schedule is generated relative to midnight of the day you are simulating. The value is expressed in days from midnight, so the defualt value of 0.2916666 = .2916666*24 = 7 hours before midnight, or 5 p.m. With a cutoff time of 5 p.m., your planned schedule will only include cases that were added to the schedule before 5 p.m. the day before. A cutoff value of .08333 would be equal to 2 hours before midnight, or 10 p.m. The cutoff value can also be negative: a cutoff value of -.08333 would be equal to two hours past midnight, or 2 a.m. the day of the surgeries. The best way to calculate the correct cutoff time is to take the number of hours before/after midnight you would like to plan the schedule at and divide by 24, with positive values representing before midnight and negative values representing after midnight on they day of the planned surgeries.

Example

`example_class = ORSim.HersheyORSim(selected_month = "Apr", selected_weekday = "Tue", selected_cutoff_time=0.2916666)` instantiates an instance of the HersheyORSim class.

planSchedule method

The planSchedule() method is a function inside the HersheyORSim class that generates a plausible planned schedule based on the inputs.

Parameters

None, inherits from the HersheyORSim class.

Example

`planned_schedule = example_class.planSchedule()` creates a planned schedule using the parameters given to `example_class`

simulateSchedule method

The simulateSchedule() method is a function inside the HersheyORSim class that simulates a day's actual schedule based on a planned schedule.

Parameters

- `planned_schedule` a planned day's schedule generated from running the planSchedule() or selectRealSchedule() functions.
- Inherits selected_month, selected_weekday, and selected_cutoff_time from the HersheyORSim class it's called from.

Example

`simulated_schedule = example_class.simulateSchedule(planned_schedule=planned_schedule)` simulates the planned schedule it was given.

selectRealSchedule method

The selectRealSchedule() method is a function inside of HersheyORSim that returns the planned schedule for a historical day at Hershey that is in our data set.

Parameters

- `selected_date` an historical date to pull the planned schedule from. Specified as YYYY/MM/DD
- Inherits selected_cutoff_time from the HersheyORSim class it's called from.

Example

```
example_class_2 = ORSim.HersheyORSim()
planned_schedule_2 = example_class_2.selectRealSchedule(selected_date="2019-04-18")
```

visualizeSchedule function

The visualizeSchedule() functions saves a visualization to the current folder of both the planned and actual schedule for a given schedule.

Parameters

- `schedule` A schedule that contains both the planned and actual data for a given day (what would be returned from running the simulateSchedule() method.
- `show_rooms` A list of rooms to include in the resulting visualization. The default is all rooms. Specified as a list: `show_rooms=["MOR 18", "MOR 05", "MOR 07"]`

Examples

```
ORSim.visualizeSchedule(schedule=simulated_schedule, show_rooms=["MOR 18", "MOR 05",
"MOR 07"])

ORSim.visualizeSchedule(schedule=simulated_schedule)
```