Mod 10 Homework: Emergency Room Simulation

In this programming assignment, you are tasked with completing the implementation of an Emergency Room Simulation. The simulation involves admitting patients to a waiting room and treating them based on the severity of their conditions. The waiting room is managed using a priority queue.

Code Structure:

`Patient Class:`

Patient class represents a patient with attributes `name` and `severity`. The `severity` is used for prioritizing patients in the waiting room.

`PriorityQueue Class:`

PriorityQueue class represents a priority queue to manage patients in the waiting room.

1. Complete the `_upheap` method to ensure the heap property is maintained when adding an element.
2. Complete the `_downheap` method to ensure the heap property is maintained when removing the root element.

`EmergencyRoom Class:`

EmergencyRoom class represents the main simulation.

3. Complete the `admit_patient` method to admit a patient to the waiting room using the priority queue.
4. Complete the `treat_patient` method to treat the next patient in the waiting room.

Output example

```
Patient-1 admitted to the emergency room with severity 10
Patient-2 admitted to the emergency room with severity 2
Patient-3 admitted to the emergency room with severity 7
Patient-4 admitted to the emergency room with severity 4
Patient-5 admitted to the emergency room with severity 9
Patient-6 admitted to the emergency room with severity 4
Patient-7 admitted to the emergency room with severity 8
Patient-8 admitted to the emergency room with severity 6
Patient-9 admitted to the emergency room with severity 10
Patient-10 admitted to the emergency room with severity 3
Treating Patient-1 with severity 10
Treating Patient-9 with severity 10
Treating Patient-5 with severity 9
Treating Patient-7 with severity 8
Treating Patient-3 with severity 7
Treating Patient-8 with severity 6
Treating Patient-4 with severity 4
Treating Patient-6 with severity 4
```

```
Treating Patient-10 with severity 3
Treating Patient-2 with severity 2
```

Unit Testing:

Write unittests for the following methods in the TestEmergencyRoomSimulation class:

1. `test_patient_creation`: Test the creation of a Patient object.
2. `test_priority_queue_push_pop`: Test the push and pop operations in the priority queue.
3. `test_emergency_room_simulation`: Test the overall simulation process in the EmergencyRoom class.
   Ensure that your unittests cover various scenarios, including edge cases.

Submission Instructions:

Submit the following files:

- hw10.py
- test_hw10.py

This homework is due Tuesday 11/28.

Notes:

- Do not import any external libraries.
- You are provided with starter code for the Emergency Room Simulation.
- Follow the provided coding conventions and use meaningful variable/method names.
- Ensure that your code is well-documented with clear explanations for each method.