1) Consider shuttle dispatching problem in which a dispatcher is responsible to decide whether or not to dispatch a shuttle at each decision epoch depending on number of customers waiting for the service. A standard shuttle dispatch problem has following parameters:

K = The capacity of a shuttle if it is dispatched.
A_t = A random variable giving the number of customers arriving during time interval t.
c_f = The cost of dispatching a shuttle.
c_h = The cost per customer left waiting per time period.

Given $K = 15$, $c_f = 100$, $c_h = 2$ and assuming that A_t follows unif{1,5}, model the problem and solve it using:

a) Enumeration (with time period T =500)
b) Value iteration ($T = \infty$)
c) Policy iteration.
You can assume that number of people in station can not exceed 200 and discount rate $\gamma = 0.95$. If you make any other assumption, please mention it on top of your code as comment.
For part (a), plot optimal value function at time 0 versus number of customers waiting.
For part (b), plot optimal value function versus number of customers waiting.
For part (c), plot optimal policy versus number of customers waiting.

2) Now consider the multiclass problem in which we have different types of customers. Assume that there are 5 types of customers with $c_h = \{1, 1.5, 2, 2.5, 3\}$ and each type can have maximum 100 people of each class waiting for shuttle and A_t for each class follows same distribution. Capacity of the shuttle is K = 30. Try to repeat a), b) and c) from problem 1.

Notes: Your code should run without errors. Your submission should contain the plots (either in Jupyter or as a separate pdf file).
No Canvas submission is needed. Please submit through github. Feel free to add a pdf file if needed which contains the results, plots, assumptions, etc.