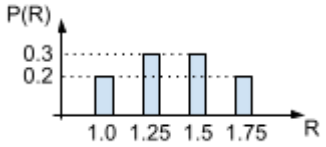
CENG 461 Artificial Intelligence
Homework 3

Due date: 07.01.2023

Implementation:
You are expected to write a Python program which calculates and plots the best policy for the given problem:

In a village, the fishers need to decide the optimal number of fish to catch each year. They try to maximize the harvest, keeping in mind that overfishing would decrease the yield the next year. The rate of growth, **R**, for the fish population is a random variable which is used to estimate the population of next year by multiplying the number of remaining fish with R and rounding it to the nearest integer. However, due to the limited resources of the lake, the fish population cannot exceed **M**.

Probability over R is distributed as the following:



With the discount factor as 0.9 and M as 100, calculate the optimal policy

- **a.** using value iteration
- **b.** using modified policy iteration

and plot the policy versus state graph.

Reporting:

1. Compare the time efficiency of the two algorithms.
2. Try with different M and formulate action as a function of state and M.
3. Try with discount factor as 1 and comment on your findings.