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**CSE 4309: Introduction to Machine Learning**

**Assignment 7**

**Task 1**

python value\_iteration.py environment2.txt -0.04 1 20

0.812, 0.868, 0.918, 1.000

0.762, 0.000, 0.660,-1.000

0.705, 0.655, 0.611, 0.387

python value\_iteration.py environment2.txt -0.04 0.9 20

0.509, 0.650, 0.795, 1.000

0.399, 0.000, 0.486,-1.000

0.296, 0.254, 0.345, 0.130

**Task 4**

**Part a:**

Utility(UP) = 0.8\*1 + 0.2\*-0.04 = 0.792

Utility(DOWN) = 0.8\*-1 + 0.2\*-0.04 = -0.808

Utility(LEFT) = 0.8\*-0.04 + 0.1\*1 + 0.1\*-1 = -0.032

Utility(RIGHT) = 0.8\*-0.04 + 0.1\*1 + 0.1\*-1 = -0.032

Max(0.792, -0.808, -0.032, -0.032) = 0.798

Utility(2, 2) = -0.04 + 0.9\*0.798 = 0.68

**Part b:**

Utility(UP) = 0.8\*1 + 0.2\*r

Utility(LEFT) = 0.8\*r

For UP not to be optimal, any other action should be more optimal. In this case, we find r values for which LEFT is optimal.

0.8r > 0.8 + 0.2r

0.6r > 0.8

r > 0.8/0.6

r > 1.33