CS3613 – INTRODUCTION TO ARTIFICIAL INTELLIGENCE

**LAB – MDPs**

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EXERCISE 01

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| State | Expected utility for taking each action | | | | | Best Action | Expected Utility for Best Action | Updated Utility |
| North | East | South | West | Nothing |
| 1 | 0 | 0 | 0 | 0 | 0 | - | 0 | -0.1 |
| 2 | 0 | 0 | 0 | 0 | 0 | - | 0 | -0.1 |
| 3 | 0 | 0 | 0 | 0 | 0 | - | 0 | 1 |
| 4 | 0 | 0 | 0 | 0 | 0 | - | 0 | -0.1 |
| 5 | 0 | 0 | 0 | 0 | 0 | - | 0 | -0.1 |
| 6 | 0 | 0 | 0 | 0 | 0 | - | 0 | -0.05 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | - | -0.1 | -0.1999 |
| 2 | -0.045 | 0.89 | -0.045 | -0.1 | -0.1 | East | 0.89 | 0.7891 |
| 3 | 0 | 0.9475 | 0.945 | -0.0425 | 1 | Nothing | 1 | 1 |
| 4 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | - | -0.1 | -0.1999 |
| 5 | -0.0975 | -0.055 | -0.0975 | -0.1 | -0.1 | East | -0.055 | -0.1549 |
| 6 | -0.0525 | 0.0025 | 0.8925 | -0.0425 | -0.05 | South | 0.8925 | 0.8416 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | -0.1505 | 0.6902 | -0.1505 | -0.1999 | -0.1999 | East | 0.6902 | 0.5895 |
| 2 | -0.0994 | 0.9317 | 0.7502 | -0.1482 | 0.7891 | East | 0.9317 | 0.8308 |
| 3 | 0.8469 | 0.9921 | 0.9895 | 0.8023 | 1 | Nothing | 1 | 1 |
| 4 | -0.1976 | -0.1594 | -0.1976 | -0.1999 | -0.1999 | East | -0.1594 | -0.2592 |
| 5 | -0.1073 | 0.7892 | 0.7423 | -0.1482 | -0.1549 | East | 0.7892 | 0.6884 |
| 6 | 0.7918 | 0.8495 | 0.9343 | -0.0473 | 0.8416 | South | 0.9343 | 0.8834 |

EXERCISE 02

|  |  |  |
| --- | --- | --- |
| East  **1**  **4** | East  **5** | South  **6** |
| East | East  **2** | Nothing  **3** |

EXERCISE 03

What is the best policy at the end?

**Same as given above.**

|  |  |  |
| --- | --- | --- |
| East  **1**  **4** | East  **5** | South  **6** |
| East | East  **2** | Nothing  **3** |

On what iteration does the policy converge?

**3**

How many iterations does it take the utilities to converge?

**12**

