**ITEC451**

**Activity 32 – Solution**

**Name: .**

1. Game Theory: In Information Warfare, we want to maximize a propagation delay of the enemy’s communication path by blocking some communication links. Unfortunately, due to our limited capability at this moment, we can block only one road leading out of City A and one road leading out of City N. They will not know which roads have been blocked until they try to use the blocked link at City A or City N. Which links should we block to maximize the propagation delay of the communication from City Y to City D? Propagation delay will increase in proportion to the distance. (Note: This problem is based on the problem 3 in page 807 of the textbook.)

|  |  |
| --- | --- |
| Communication Link | Length of Communication Link (Miles) |
| City Y – City A | 800 |
| City Y – City N | 900 |
| City N – City S | 400 |
| City N – City O | 200 |
| City A – City S | 300 |
| City A – City O | 600 |
| City S – City D | 500 |
| City O – City D | 300 |

Solution

Since we want to maximize the propagation delay of the enemy’s communication path, let us be the row player. Then, the following reward matrix can be obtained:

|  |  |  |  |
| --- | --- | --- | --- |
| We leaves unblocked | The enemy goes to | | **Row Min** |
| City A | City N |
| (City A – City S) & (City N – City S) | 1600 | 1800 | **1600** |
| (City A – City O) & (City N – City S) | 1700 | 1800 | **1700** |
| (City A – City S) & (City N – City O) | 1600 | 1400 | **1400** |
| (City A – City O) & (City N – City O) | 1700 | 1400 | **1400** |
| **Col Max** | **1700** | **1800** |  |

Since max(row min) = min(column max) = 1700 we find that the enemy going to City A and we leaving (City A ‑ City O) and (City N – City S) roads unblocked (or blocking City A – City S and City N – City O) is a saddle point. Total length of the enemy’s communication path will be 1700 miles.