**Resource Allocation challenge**

There are 4 suspects identified. Upon knowing the locations of the suspects, MHQ is preparing to deploy 4 teams of investigation officers to apprehend the suspects.

Using Mixed Integer programming, you are to work out a resource allocation plan (assign 1 team to each suspect), based on the information given to maximise overall reward.

Information 1:

Suspects may hide/run away to avoid being captured. Hence, the team must reach the suspect in at least 30 mins, otherwise the suspect will no longer be at that location. Table below shows the probability of each team reaching each of the suspect’s location within 30 minutes, given the current traffic conditions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Team** | **Probability (suspect1)** | **Probability (suspect2)** | **Probability (suspect3)** | **Probability (suspect4)** |
| Team Agility | 0.7 | 0.5 | 0.5 | 0.8 |
| Team Bravery | 0.6 | 0.7 | 0.6 | 0.8 |
| Team Courage | 0.8 | 0.6 | 0.7 | 0.6 |
| Team Determination | 0.8 | 0.8 | 0.6 | 0.4 |

Information 2:

Each team of investigation officers have different success rate of apprehending the suspect + finding evidence. This is determined based on their track records. The table below shows their success rate.

|  |  |
| --- | --- |
| **Team** | **Success rate** |
| Team Agility | 85% |
| Team Bravery | 80% |
| Team Courage | 70% |
| Team Determination | 60% |

Information 3:

Table below shows the penalties for not apprehending the suspects, worked out based on the possible damages caused.

|  |  |
| --- | --- |
| **Team** | **Penalty** |
| Suspect 1 | 900 |
| Suspect 2 | 1000 |
| Suspect 3 | 1100 |
| Suspect 4 | 800 |