**Artificial Intelligence Lab 03 (Alpha-Beta Pruning)**

**EEE472/CSE422**

**(Winner finding problem)**

**                       **

          Optimus                                                 Prime Megatron

This is 2082. Robots have taken over the world. The International Robot Sports Committee  (IRSC) has been arranging Olympics for recreations of fellow robots for the last 10 years. In  Robot Olympic 2082, there is a game called ‘ROBO Sword-Fight’. In this game, two robots fight  against each other using swords.

One of the participants in the ROBO Sword-Fight is Optimus Prime. Optimus Prime convincingly  won each of his previous games. There is only one game left for him to reach glory, and he will  have to fight Megatron in that game. In order to win the game, Optimus Prime will have to  achieve a certain amount of points.

You have to perform the two tasks given below by using Alpha-Beta pruning.

**Task 1: Calculate the points and find if Optimus Prime won or not. [6]**

**Task 2: Shuffle the generated list by S times and find how many times  Optimus Prime won. [4]**

**[Hint:** This will be a 4-level binary tree. On Level 0(MAX), it will be Optimus Prime’s Turn. On  Level 1(MIN) it will be Megatron’s Turn. On Level 2(MAX), again it will be Optimus Prime’s Turn.  On Level 3, there will be Terminal Nodes]

**NOTE: If any digit in your id is 0 consider it as 8**

**—--------------------------------------------------------------------------------------------------------Sample Input 1 :**

Enter your student ID

**25485465**

**Sample Output 1(For Task-1):**

Generated 8 random points between the minimum and maximum point limits:  [66, 74, 14, 73, 19, 26, 32, 40]

Total points to win: 56

Achieved point by applying alpha-beta pruning = 73

The winner is Optimus Prime

[**How to find the winner**: As the achieved point by Optimus Prime is 73 which is greater than 56, Optimus Prime wins. If the Achieved point by applying alpha-beta pruning >= Total points to win, then Winner is Optimus Prime. Otherwise, the Winner is Megatron]

**Sample Output 1(For Task-2):**

After the shuffle:

List of all points values from each shuffles: [66, 73, 66, 73, 73, 66, 40, 66] The maximum value of all shuffles: 73

Won 7 times out of 8 number of shuffles

**Explanation:**

|  |  |
| --- | --- |
| 2548**5**465 = 5  ( 5th digit of your student ID) | Minimum points the Optimus Prime can  achieve from the game is 5 |
| 254854**65** = 56\*1.5 = 84  ( Reverse last 2 digits of your student ID and  multiply that number with 1.25 and take  nearest integer (upper)) | 1. Maximum points the Optimus  Prime can achieve from the game  = 84  2. Total points to win = 56  (reverse of last two digits of the ID) |

|  |  |
| --- | --- |
| 25485465 = 8  (4th digit of your student ID) | Total number of shuffles, S = 8 (for Task-2) |

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**Sample Input 2 :**

Enter your student ID

**17564039**

**Sample Output 2**:

Generated 8 random points between the minimum and maximum point limits:  [36, 26, 112, 57, 85, 80, 107, 28]

Total points to win: 93

Achieved point by applying alpha-beta pruning = 85

The Winner is Megatron

After the shuffle:

List of all points values from each shuffle: [107, 80, 85, 80, 85, 107]

The maximum value of all shuffles: 107

Won 2 times out of 6 number of shuffles