# CA3 – Game (Sim)

## Amir Ali Vahidi    810199511

**Results over 100 play rounds without prune:**

```
depth= 1
red: 78 blue: 22
average time= 0.0003989458084106445
```

```
depth= 3
red: 79 blue: 21
average time= 0.022337710857391356
```

```
depth= 5
red: 10 blue: 0
average time= 2.111538147926307
```

```
depth= 5
red: 78 blue: 22
average time= 2.234119565486908
```

**Results over 100 play rounds with prune:**

```
depth= 1
red: 85 blue: 15
average time= 0.0004033708572387695
```

```
depth= 3
red: 86 blue: 14
average time= 0.0033790755271911623
```

```
depth= 5
red: 95 blue: 5
average time= 0.031373057365417484
```

```
depth= 7
red: 84 blue: 16
average time= 0.2667672514915466
```

**Questions:**

**1- *What are the features of a good heuristic? Name the reasons for superiority of your code.***
A good heuristic should be admissible and the more efficient it works in practice, the better it is. My heuristic uses number of lines connected to one points and by that it means the more blue lines almost creating a triangle and less red lines almost creating a triangle, the heuristic returns the greater number. And my heuristic is admissible because for a line to be added to form a triangle, its cost is certainly greater than or equal to heuristic cost.

**2- *Relationship between the depth of the algorithm and the calculated parameters***
The deeper the depth gets, it calculates more closely to the actual cost and not just based on heuristic evaluation. So when the depth is getting higher, the chance of winning increases.

**3- *Order of the node children added when using prune***
I check the first, the second ,.. children of the node and if alpha or beta are greater than min_node and lesser than max_node, the code will continue on parent node and won't check other childrens. Its order does matter and can increase or decrease child nodes number that should be visited.