

Enter the number of times to repeat the entire program: 20

Enter the number of test cases per scenario: 100000

Beginning Run 1

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000

Goals: 76386

Saves: 23614

Goalkeeper Success Rate: 23.61 %

Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000

Goals: 70319

Saves: 29676

Goalkeeper Success Rate: 29.68 %

Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000

Goals: 63585

Saves: 36415

Goalkeeper Success Rate: 36.41 %

Scenario 3 done  
-----

Beginning Run 2

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000

Goals: 76175

Saves: 23825

Goalkeeper Success Rate: 23.82 %

Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000

Goals: 75704

Saves: 24291

Goalkeeper Success Rate: 24.29 %

Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 65740  
Saves: 34260  
Goalkeeper Success Rate: 34.26 %  
Scenario 3 done  
-----

Beginning Run 3

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000  
Goals: 76026  
Saves: 23974  
Goalkeeper Success Rate: 23.97 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 76523  
Saves: 23472  
Goalkeeper Success Rate: 23.47 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 65726  
Saves: 34274  
Goalkeeper Success Rate: 34.27 %  
Scenario 3 done  
-----

Beginning Run 4

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000  
Goals: 76530  
Saves: 23470  
Goalkeeper Success Rate: 23.47 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 75797  
Saves: 24198  
Goalkeeper Success Rate: 24.2 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 64813  
Saves: 35187  
Goalkeeper Success Rate: 35.19 %  
Scenario 3 done  
-----

Beginning Run 5

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000  
Goals: 76107  
Saves: 23893  
Goalkeeper Success Rate: 23.89 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 75529  
Saves: 24466  
Goalkeeper Success Rate: 24.47 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 65930  
Saves: 34070  
Goalkeeper Success Rate: 34.07 %  
Scenario 3 done  
-----

Beginning Run 6

#### Beginning Scenario 1 - Goalie jumps in Random Direction

---

Number of penalties: 100000  
Goals: 76173  
Saves: 23827  
Goalkeeper Success Rate: 23.83 %  
Scenario 1 done

#### Starting scenario 2 - Goalie jumps in Team's frequent kick direction

---

Number of penalties: 100000  
Goals: 74858  
Saves: 25137  
Goalkeeper Success Rate: 25.14 %  
Scenario 2 done

#### Starting scenario 3 - Goalie jumps in Player's frequent kick direction

---

Number of penalties: 100000  
Goals: 65628  
Saves: 34372  
Goalkeeper Success Rate: 34.37 %  
Scenario 3 done

---

#### Beginning Run 7

#### Beginning Scenario 1 - Goalie jumps in Random Direction

---

Number of penalties: 100000  
Goals: 76103  
Saves: 23897  
Goalkeeper Success Rate: 23.9 %  
Scenario 1 done

#### Starting scenario 2 - Goalie jumps in Team's frequent kick direction

---

Number of penalties: 100000  
Goals: 74919  
Saves: 25076  
Goalkeeper Success Rate: 25.08 %  
Scenario 2 done

#### Starting scenario 3 - Goalie jumps in Player's frequent kick direction

---

Number of penalties: 100000  
Goals: 66237

Saves: 33763  
Goalkeeper Success Rate: 33.76 %  
Scenario 3 done  
-----

Beginning Run 8

Beginning Scenario 1 - Goalie jumps in Random Direction  
-----

Number of penalties: 100000  
Goals: 76138  
Saves: 23862  
Goalkeeper Success Rate: 23.86 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction  
-----

Number of penalties: 100000  
Goals: 75230  
Saves: 24765  
Goalkeeper Success Rate: 24.77 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction  
-----

Number of penalties: 100000  
Goals: 66781  
Saves: 33219  
Goalkeeper Success Rate: 33.22 %  
Scenario 3 done  
-----

Beginning Run 9

Beginning Scenario 1 - Goalie jumps in Random Direction  
-----

Number of penalties: 100000  
Goals: 76475  
Saves: 23525  
Goalkeeper Success Rate: 23.52 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction  
-----

Number of penalties: 100000  
Goals: 75600

Saves: 24395  
Goalkeeper Success Rate: 24.39 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 67192  
Saves: 32808  
Goalkeeper Success Rate: 32.81 %  
Scenario 3 done  
-----

Beginning Run 10

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000  
Goals: 76070  
Saves: 23930  
Goalkeeper Success Rate: 23.93 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 75586  
Saves: 24409  
Goalkeeper Success Rate: 24.41 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 67316  
Saves: 32684  
Goalkeeper Success Rate: 32.68 %  
Scenario 3 done  
-----

Beginning Run 11

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000  
Goals: 76103

Saves: 23897  
Goalkeeper Success Rate: 23.9 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 76121  
Saves: 23874  
Goalkeeper Success Rate: 23.87 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 68003  
Saves: 31997  
Goalkeeper Success Rate: 32.0 %  
Scenario 3 done  
-----

Beginning Run 12

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000  
Goals: 76153  
Saves: 23847  
Goalkeeper Success Rate: 23.85 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 75853  
Saves: 24142  
Goalkeeper Success Rate: 24.14 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 68226  
Saves: 31774  
Goalkeeper Success Rate: 31.77 %  
Scenario 3 done  
-----

Beginning Run 13

Beginning Scenario 1 - Goalie jumps in Random Direction

-----

Number of penalties: 100000  
Goals: 76185  
Saves: 23815  
Goalkeeper Success Rate: 23.82 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----

Number of penalties: 100000  
Goals: 76105  
Saves: 23890  
Goalkeeper Success Rate: 23.89 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----

Number of penalties: 100000  
Goals: 68124  
Saves: 31876  
Goalkeeper Success Rate: 31.88 %  
Scenario 3 done

-----

Beginning Run 14

Beginning Scenario 1 - Goalie jumps in Random Direction

-----

Number of penalties: 100000  
Goals: 76493  
Saves: 23507  
Goalkeeper Success Rate: 23.51 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----

Number of penalties: 100000  
Goals: 75732  
Saves: 24263  
Goalkeeper Success Rate: 24.26 %  
Scenario 2 done



Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 67982  
Saves: 32018  
Goalkeeper Success Rate: 32.02 %  
Scenario 3 done  
-----

Beginning Run 15

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000  
Goals: 76250  
Saves: 23750  
Goalkeeper Success Rate: 23.75 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 76333  
Saves: 23662  
Goalkeeper Success Rate: 23.66 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 67753  
Saves: 32247  
Goalkeeper Success Rate: 32.25 %  
Scenario 3 done  
-----

Beginning Run 16

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000  
Goals: 76062  
Saves: 23938  
Goalkeeper Success Rate: 23.94 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 76063  
Saves: 23932  
Goalkeeper Success Rate: 23.93 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 67648  
Saves: 32352  
Goalkeeper Success Rate: 32.35 %  
Scenario 3 done  
-----

Beginning Run 17

Beginning Scenario 1 - Goalie jumps in Random Direction

-----  
Number of penalties: 100000  
Goals: 76216  
Saves: 23784  
Goalkeeper Success Rate: 23.78 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 76328  
Saves: 23667  
Goalkeeper Success Rate: 23.67 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----  
Number of penalties: 100000  
Goals: 67832  
Saves: 32168  
Goalkeeper Success Rate: 32.17 %  
Scenario 3 done  
-----

Beginning Run 18

#### Beginning Scenario 1 - Goalie jumps in Random Direction

---

Number of penalties: 100000  
Goals: 76382  
Saves: 23618  
Goalkeeper Success Rate: 23.62 %  
Scenario 1 done

#### Starting scenario 2 - Goalie jumps in Team's frequent kick direction

---

Number of penalties: 100000  
Goals: 76071  
Saves: 23924  
Goalkeeper Success Rate: 23.92 %  
Scenario 2 done

#### Starting scenario 3 - Goalie jumps in Player's frequent kick direction

---

Number of penalties: 100000  
Goals: 68209  
Saves: 31791  
Goalkeeper Success Rate: 31.79 %  
Scenario 3 done

---

Beginning Run 19

#### Beginning Scenario 1 - Goalie jumps in Random Direction

---

Number of penalties: 100000  
Goals: 76264  
Saves: 23736  
Goalkeeper Success Rate: 23.74 %  
Scenario 1 done

#### Starting scenario 2 - Goalie jumps in Team's frequent kick direction

---

Number of penalties: 100000  
Goals: 75762  
Saves: 24233  
Goalkeeper Success Rate: 24.23 %  
Scenario 2 done

#### Starting scenario 3 - Goalie jumps in Player's frequent kick direction

---

Number of penalties: 100000  
Goals: 67847

Saves: 32153  
Goalkeeper Success Rate: 32.15 %  
Scenario 3 done

-----

Beginning Run 20

Beginning Scenario 1 - Goalie jumps in Random Direction

-----

Number of penalties: 100000  
Goals: 76187  
Saves: 23813  
Goalkeeper Success Rate: 23.81 %  
Scenario 1 done

Starting scenario 2 - Goalie jumps in Team's frequent kick direction

-----

Number of penalties: 100000  
Goals: 76162  
Saves: 23833  
Goalkeeper Success Rate: 23.83 %  
Scenario 2 done

Starting scenario 3 - Goalie jumps in Player's frequent kick direction

-----

Number of penalties: 100000  
Goals: 67924  
Saves: 32076  
Goalkeeper Success Rate: 32.08 %  
Scenario 3 done

-----

	Scenario 1	Scenario 2	Scenario 3
0	23.61	29.68	36.42
1	23.82	24.29	34.26
2	23.97	23.47	34.27
3	23.47	24.20	35.19
4	23.89	24.47	34.07
5	23.83	25.14	34.37
6	23.90	25.08	33.76
7	23.86	24.76	33.22
8	23.52	24.40	32.81
9	23.93	24.41	32.68
10	23.90	23.87	32.00
11	23.85	24.14	31.77
12	23.82	23.89	31.88

13	23.51	24.26	32.02
14	23.75	23.66	32.25
15	23.94	23.93	32.35
16	23.78	23.67	32.17
17	23.62	23.92	31.79
18	23.74	24.23	32.15
19	23.81	23.83	32.08
Average	23.77	24.50	33.13

#### \*\*\*\*\* Results \*\*\*\*\*

##### Observation 1:

In Case 1 where the goalie and player both chose random directions, the goalie saved 23.77 % of the goals, on average.

##### Observation 2:

In Case 2 where the goalie selected direction based on team's past 5 kicks and players choose direction based on their individual tendency, the goalie saved 24.5 % of the goals, on average.

##### Conclusion 1:

There is an increase of 0.73 % if the goalie knows the team's last 5 directions compared to the goalie choosing random directions.

##### Observation 3:

In Case 3 where the goalie selected direction based on player's past 5 kicks and players choose direction based on their individual tendency, the goalie saved 33.13 % of the goals, on average.

##### Conclusion 2:

There is an increase of 9.36 % if the goalie knows the player's last 5 directions compared to the goalie choosing random directions.

A graph of the above observations is displayed in a separate window

Close the Graph to end the program.