Golf is Hard

January 2023

JT

Greetings! Like many of you, i've got a fever and the only prescription is making tee time and riding the emotional roller coaster that is a day at the links.

I love data, math, and sports. Golf has a lot of data that can be measured, and that which can be measured can be improved more easily. It's my goal to understand more and more of my gameplay, consistencies, improvements, weaknesses, etc so I can ~go pro and buy a beachouse in hawaii~ continue to imorove and lower my score.

The thing I say the most common when golfing not of a four letter variety is "Golf is Hard". That's what I've called the accompanying repository that I'm using to track my progress.

In [1]:
```python
# Imports of Classes needed to save courses
import sys
sys.path.append('src/')
import datetime
from util import analyze
import pickle as pkl
from Course import Course
from Hole import Hole
```

The first time I tried to play 18 holes of golf by myself I left the house with 7 balls, and told my wife I would be back "In probably about 2 hours", because I had no idea how long a round of golf would take. After the 9th hole I was down to my last ball and our foursome had been out two and a half hours already, so I decided to make it a 9 hole kinda day. I've still been too intimidated to play a full round of golf, but I've played plenty of 9 hole games since then. Let's create my favorite course (which all but one of my games are on this month), the Northwest Inner 9.

In [2]:
```python
# Stroke index (or handicap on score sheets sometimes) is the ranking
# of difficulty of the hole. 1 is the hardest, 9 is the easiest. When
# adding handicap strokes, extra strokes are given on hard holes before
# easy ones.

holes = [
    Hole(number=1, yards=362, par=4, stroke_index=2),
    Hole(number=2, yards=385, par=4, stroke_index=3),
    Hole(number=3, yards=301, par=4, stroke_index=4),
    Hole(number=4, yards=312, par=4, stroke_index=6),
    Hole(number=5, yards=97,  par=3, stroke_index=9),
    Hole(number=6, yards=389, par=4, stroke_index=1),
    Hole(number=7, yards=306, par=4, stroke_index=8),
    Hole(number=8, yards=175, par=3, stroke_index=7, comments="JT's first par"),
    Hole(number=9, yards=310, par=4, stroke_index=5),
]
```

```
course = Course("Northwest Inner 9", holes)
course.save()
```
```
Loading from Saved
Already saved, use force=True to overwrite
```

I've been heading to the driving range and top golf probably 2-3 times a week, and have taken 2 lessons about my swing. I'm an awful putter, and rarely drive from the tee box, I either use a hybrid or 5 wood so I'm not always starting from the woods.

Now let's play some golf.

First game I was put with a father/son pair; the son had pretty good distance with his drives (the father too), but he hit with a very strong draw. I don't call it a slice only because he seemed to be able to aim it fairly well, it was impressive to watch. Playing with my hybrid, drove the last hole. Finished an embarassing 28 over par on 9 holes. Golf is hard!!

In [3]:
```python
first_game_time = datetime.datetime(2022, 12, 30, 10, 0)
first_game_scores = [7, 8, 8, 6, 5, 8, 7, 5, 8]

# Tee time temperature = 33 degrees F. The ground was frozen,
# had to use no penetration tees
first_game_data = course.play('jt', first_game_scores,
                              first_game_time, ttt=33)
print(analyze(first_game_data))
```

```
[24]
Player: jt (Handicap 48.0 (18 Hole))
Course: Northwest_Inner_9
Date: Friday_12_30_2022_10:00
-----------------------------------------------------------------
|HOLE |   1 |   2 |   3 |   4 |   5 |   6 |   7 |   8 |   9 | TOT |
-----------------------------------------------------------------
|YDS  | 362 | 385 | 301 | 312 |  97 | 389 | 306 | 175 | 310 |2637 |
-----------------------------------------------------------------
|SI   |   2 |   3 |   4 |   6 |   9 |   1 |   8 |   7 |   5 |     |
-----------------------------------------------------------------
|PAR  |   4 |   4 |   4 |   4 |   3 |   4 |   4 |   3 |   4 |  34 |
-----------------------------------------------------------------
|TRGT |   7 |   7 |   7 |   7 |   6 |   7 |   7 |   6 |   7 |  61 |
-----------------------------------------------------------------
|SHOT |   7 |   8 |   8 |   6 |   5 |   8 |   7 |   5 |   8 |  62 |
-----------------------------------------------------------------
|SCRE |   3 |   4 |   4 |   2 |   2 |   4 |   3 |   2 |   4 | +28 |
-----------------------------------------------------------------
|HCAP |   0 |   1 |   1 |  -1 |  -1 |   1 |   0 |  -1 |   1 | + 1 |
-----------------------------------------------------------------

Raw (+28):
Double Bogey :   3
Triple Bogey :   2
        +4 :   4

With Handicap (+1):
Birdie       :   3
Par          :   2
Bogey        :   4
```

Total Score: 62

This is probably the busiest scorecard you've ever seen in golf, but I've added in my handicap information so that I get a better gauge of how "good" or "bad" I did (I always do "bad", because golf is hard but shooting one over my handicap is a lot easier to accept than shooting 28 over par on a quick 9). I tuned the starting handicap so that my first game was a +1, and its a rolling average after that.

Let's play some more golf! Second game I got my first par. Played with a self described "beginner golf fan" that was out there having fun as we tried to jam tees into the frozen ground. I got my first par! On a somewhat hard par 3 as well, 175 yards. First shot was a hybrid shot that handed right in the driving range, pitching wedge put me around 10 feet from the hole where I had the putt of my life.

In [4]:

```python
second_game_time = datetime.datetime(2023, 1, 7, 10, 30)
secon_game_scores = [8, 6, 7, 8, 5, 8, 6, 3, 8]
second_game_data = course.play('jt', secon_game_scores,
                               second_game_time, ttt=34)
print(analyze(second_game_data))
```

```
[28, 24]
Player: jt (Handicap 52.0 (18 Hole))
Course: Northwest_Inner_9
Date: Saturday_01_07_2023_10:30
```

HOLE	1	2	3	4	5	6	7	8	9	TOT
YDS	362	385	301	312	97	389	306	175	310	2637
SI	2	3	4	6	9	1	8	7	5	
PAR	4	4	4	4	3	4	4	3	4	34
TRGT	7	7	7	7	6	7	7	6	7	61
SHOT	8	6	7	8	5	8	6	3	8	59
SCRE	4	2	3	4	2	4	2	0	4	+25
HCAP	1	-1	0	1	-1	1	-1	-3	1	-2

```
Raw (+25):
          Par :   1
 Double Bogey :   3
 Triple Bogey :   1
           +4 :   4

With Handicap (-2):
 Albatross    :   1
 Birdie       :   3
 Par          :   1
 Bogey        :   4
```

Total Score: 59

That's one thing I'm noticing with the handicaps...I'm a bimodal inconsistent golfer. Sinking an albatross (3 under par, extrordinarily rare in regulation golf) and 4 bogeys on the same quick 9 is comical. Two under!

Let's play more golf. Third game was on the saturday of MLK weekend. Coldest day I've golfed, was by myself.

In [5]:
```python
third_game_time = datetime.datetime(2023, 1, 14, 11, 30)
third_game_scores = [6, 7, 8, 6, 4, 7, 6, 4, 6]
third_game_data = course.play('jt', third_game_scores,
                              third_game_time, ttt=22)
print(analyze(third_game_data))
```

```
[28, 25, 24]
Player: jt (Handicap 51.3 (18 Hole))
Course: Northwest_Inner_9
Date: Saturday_01_14_2023_11:30
-----------------------------------------------------------------
|HOLE |   1 |   2 |   3 |   4 |   5 |   6 |   7 |   8 |   9 | TOT |
-----------------------------------------------------------------
|YDS  | 362 | 385 | 301 | 312 |  97 | 389 | 306 | 175 | 310 |2637 |
-----------------------------------------------------------------
|SI   |   2 |   3 |   4 |   6 |   9 |   1 |   8 |   7 |   5 |     |
-----------------------------------------------------------------
|PAR  |   4 |   4 |   4 |   4 |   3 |   4 |   4 |   3 |   4 |  34 |
-----------------------------------------------------------------
|TRGT |   7 |   7 |   7 |   7 |   6 |   7 |   7 |   6 |   7 |  61 |
-----------------------------------------------------------------
|SHOT |   6 |   7 |   8 |   6 |   4 |   7 |   6 |   4 |   6 |  54 |
-----------------------------------------------------------------
|SCRE |   2 |   3 |   4 |   2 |   1 |   3 |   2 |   1 |   2 | +20 |
-----------------------------------------------------------------
|HCAP |  -1 |   0 |   1 |  -1 |  -2 |   0 |  -1 |  -2 |  -1 |  -7 |
-----------------------------------------------------------------

Raw (+20):
        Bogey :  2
 Double Bogey :  4
 Triple Bogey :  2
           +4 :  1

With Handicap (-7):
Eagle         :  2
Birdie        :  4
Par           :  2
Bogey         :  1

Total Score: 54
```

Hey that was fun...*lets play MORE golf!*

I decided to venture outside my comfort zone and try a new course! The day after shooting +20 I decided to check out the needwood executive course. At 9 holes and a distance of 1532 yards, this

is a par 3 palooza! First let's create a new 9 hole course:

In [6]:

```python
holes = [
    Hole(number=1, yards=170, par=3, stroke_index=5),
    Hole(number=2, yards=105, par=3, stroke_index=9),
    Hole(number=3, yards=275, par=4, stroke_index=2),
    Hole(number=4, yards=103, par=3, stroke_index=8),
    Hole(number=5, yards=87,  par=3, stroke_index=3),
    Hole(number=6, yards=140, par=3, stroke_index=7),
    Hole(number=7, yards=160, par=3, stroke_index=6),
    Hole(number=8, yards=359, par=4, stroke_index=1),
    Hole(number=9, yards=133, par=3, stroke_index=4),
]
needwood_course = Course("Needwood Executive 9", holes)

# Lets play golf!
fourth_game_time = datetime.datetime(2023, 1, 15, 13, 30)
fourth_game_scores = [4, 5, 6, 6, 6, 5, 7, 8, 6]

fourth_game_data = needwood_course.play('jt', fourth_game_scores,
                                        fourth_game_time, ttt=42)
print(analyze(fourth_game_data))
```

```
Loading from Saved
[28, 25, 20, 24]
Player: jt (Handicap 48.5 (18 Hole))
Course: Needwood_Executive_9
Date: Sunday_01_15_2023_13:30
-------------------------------------------------------------------
|HOLE |   1 |   2 |   3 |   4 |   5 |   6 |   7 |   8 |   9 | TOT |
-------------------------------------------------------------------
|YDS  | 170 | 105 | 275 | 103 |  87 | 140 | 160 | 359 | 133 |1532 |
-------------------------------------------------------------------
|SI   |   5 |   9 |   2 |   8 |   3 |   7 |   6 |   1 |   4 |     |
-------------------------------------------------------------------
|PAR  |   3 |   3 |   4 |   3 |   3 |   3 |   3 |   4 |   3 |  29 |
-------------------------------------------------------------------
|TRGT |   6 |   6 |   7 |   6 |   6 |   6 |   6 |   7 |   6 |  56 |
-------------------------------------------------------------------
|SHOT |   4 |   5 |   6 |   6 |   6 |   5 |   7 |   8 |   6 |  53 |
-------------------------------------------------------------------
|SCRE |   1 |   2 |   2 |   3 |   3 |   2 |   4 |   4 |   3 | +24 |
-------------------------------------------------------------------
|HCAP |  -2 |  -1 |  -1 |   0 |   0 |  -1 |   1 |   1 |   0 |  -3 |
-------------------------------------------------------------------

Raw (+24):
       Bogey :  1
Double Bogey :  3
Triple Bogey :  3
         +4 :  2

With Handicap (-3):
Eagle        :  1
Birdie       :  3
Par          :  3
Bogey        :  2
```

        Total Score: 53

Uh oh. Handicap is going to go up after this one. The first 3 games I improved, but at a course that wasn't my home course I did a little bit worse. Let's see how my 48.5 handicap shifts after this one.

Fifth and final game of January! Back at my home course at Northwest Inner 9.

LETS...PLAY...GOLF!`

In [7]:
```python
fifth_game_time = datetime.datetime(2023, 1, 16, 10, 30)
fifth_game_scores = [6, 6, 6, 7, 3, 6, 8, 6, 6]
fifth_game_data = course.play('jt', fifth_game_scores,
                              fifth_game_time, ttt=48)

print(analyze(fifth_game_data))
```

```
[28, 25, 20, 24, 24]
Player: jt (Handicap 48.4 (18 Hole))
Course: Northwest_Inner_9
Date: Monday_01_16_2023_10:30
-----------------------------------------------------------------
|HOLE |   1 |   2 |   3 |   4 |   5 |   6 |   7 |   8 |   9 | TOT |
-----------------------------------------------------------------
|YDS  | 362 | 385 | 301 | 312 |  97 | 389 | 306 | 175 | 310 |2637 |
-----------------------------------------------------------------
|SI   |   2 |   3 |   4 |   6 |   9 |   1 |   8 |   7 |   5 |     |
-----------------------------------------------------------------
|PAR  |   4 |   4 |   4 |   4 |   3 |   4 |   4 |   3 |   4 |  34 |
-----------------------------------------------------------------
|TRGT |   7 |   7 |   7 |   7 |   6 |   7 |   7 |   6 |   7 |  61 |
-----------------------------------------------------------------
|SHOT |   6 |   6 |   6 |   7 |   3 |   6 |   8 |   6 |   6 |  54 |
-----------------------------------------------------------------
|SCRE |   2 |   2 |   2 |   3 |   0 |   2 |   4 |   3 |   2 | +20 |
-----------------------------------------------------------------
|HCAP |  -1 |  -1 |  -1 |   0 |  -3 |  -1 |   1 |   0 |  -1 |  -7 |
-----------------------------------------------------------------

Raw (+20):
         Par :  1
Double Bogey :  5
Triple Bogey :  2
         +4 :  1

With Handicap (-7):
Albatross    :  1
Birdie       :  5
Par          :  2
Bogey        :  1

Total Score: 54
```

Went down by 0.1? Maybe I should explain where my handicaps are coming from...let's take a look at the last bit of my calculate handicap function:

In [8]:
```python
def calculate_handicap(scores):
    if len(scores) < 3:
        scores.append(24)   # Seed score
    else:
        scores.sort()
        scores = scores[1:-1]   # Remove the best and worst if you've played > 3
    return float(sum(scores)) / len(scores)
```
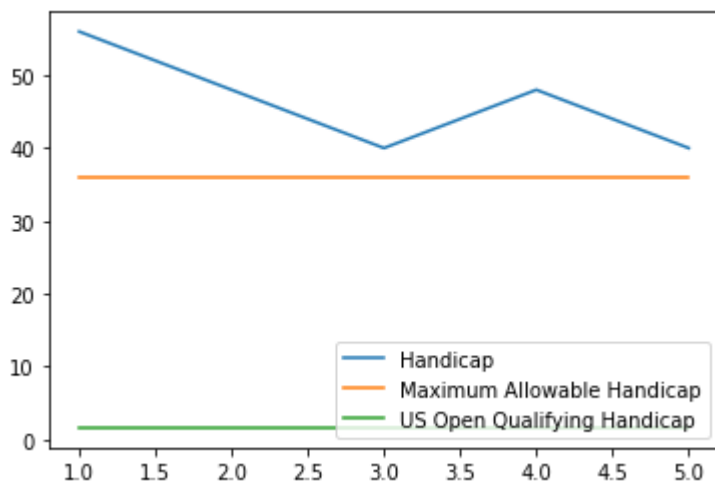
The flow for handicap I wrote out is as follows:

-If I've played less than 3 games start me at (24 x 2=) 48 handicap. The first game of golf I scored I would have shot around 48 over par on a standard 18 hole course. Makes my first few handicapped scores reasonable

-If more than 3 games, sort them and remove the best and the wrost game. I may tweak this later, but it seems to be a good representation of the *average golf* that I'm playing.

Lets graph out my actual shots over par and handicap over my first 5.

In [9]:
```python
game = [i + 1 for i in range(5)]
shot = [28, 24, 20, 24, 20]
shot = [s*2 for s in shot]
max_handicap = [36 for i in range(5)]
us_o = [1.6 for i in range(5)]
import matplotlib.pyplot as plt
plt.plot(game, shot, label='Handicap')
plt.plot(game, max_handicap, label='Maximum Allowable Handicap')
plt.plot(game, us_o, label='US Open Qualifying Handicap')
plt.legend(loc='lower right')
plt.show()
```


In [ ]: