7.5. Assume you have an MTG-DAF deck of 24 Lands, 10 Spells of cost 1, 10 Spells of cost 2, 10 Spells of cost 3, 2 Spells of cost 4, 2 Spells of cost 5, and 2 Spells of cost 6. It is properly shuffled, and you draw seven cards. At each turn, you play a land if it is in your hand, and you always only play the most expensive spell in your hand that you are able to play and you never play two spells.

(a) Write a program to estimate the probability that the first time you play a spell is on turn 4.

**Solution:** `homework7_5a.py`

```
n_experiments = 10
n_simulations = 10000

Probabilities: [0.0034 0.0031 0.0028 0.0015 0.0021 0.0026 0.0033 0.0022
                0.003 0.0028]
Mean:                  0.0027
Standard deviation:    0.0006
Number of seconds:     10
```

(b) Write a program to estimate the probability that the first spell you play has cost 4.

**Solution:** `homework7_5b.py`

```
n_experiments = 10
n_simulations = 10000

Probabilities: [0.0002 0.0001 0.0005 0.0002 0.0003 0. 0.0003 0.0001 0.0003
                0.0003]
Mean:                  0.0002
Standard deviation:    0.0001
Number of seconds:     9
```

(c) Extend your program to prepare a 6 x 6 table of turns by spells. In the $t, s$'th cell of the table, your program should place the probability that the first spell you play is played on turn $t$, and has cost $s$. Notice that many cells easily contain a zero.

**Solution:** `homework7_5c.py`

```
n_simulations = 100000

Number of seconds:     9
Probabilities:
0.77724         0.0          0.0          0.0          0.0          0.0
0.01187         0.18431      0.0          0.0          0.0          0.0
0.00374         0.00115      0.01718      0.0          0.0          0.0
0.00174         0.0004       8e-05        0.00022      0.0          0.0
0.00077         0.00017      0.0          0.0          5e-05        0.0
0.00042         5e-05        1e-05        0.0          0.0          1e-05
```