

CS 7A – Spring '13 - Lab 6

Use the `cstdlib` and `ctime` library with the `srand((unsigned) time(0))` and `rand()` functions to compute the empirical probability that a pair is drawn from an infinite deck of cards.

Note that there are 13 ranks in a deck of cards and that the formula for empirical probability is

$$\frac{\text{\#successes}}{\text{\#trials}}.$$

Use at least 10000 trials.

Submit your `.cpp` file by email as `<your_initials>lab6.cpp`

SOLN:

```
// G. Hagopian
// Lab 6 solutions : empirical probability of a pair in poker.

#include <iostream>
#include <ctime>
#include <cstdlib>
#define trials 10000

using namespace std;

int main()
{
    srand(unsigned(time(0)));
    int successes = 0;
    for(int i = 0; i < trials; ++i)
        if(rand()%13 == rand()%13) ++successes;
    cout << "\nThe empirical probability of drawing a pair is "
         << (float)successes/trials << endl;
}
```

The output is:

```
The empirical probability of drawing a pair is 0.0758
Press any key to continue . . .
```

What if it's not an infinite deck? Well then the theoretical probability is $3/51 = 1/17$, since there will be three other cards with the same rank as the first card among the 51 remaining cards. That's a significant difference: $\frac{1}{13} \approx .077 > .059 \approx \frac{1}{17}$.