Homework 3

Due in class on 2/23/2020

1. (10) Write an R code to generate a randomization sequence with the following specifications:

- The total number of subjects is 64, and 32 will be allocated to treatment A and 32 will be allocated to treatment B.
- Use Block randomization with varying block sizes, 2, 4, and 6.
- Keep track of the random seed, so the same sequence can be reproduced.

Your R function should output 1) random seed, 2) block sizes, and 3) allocation sequence. See example below:

```
$seed
[1] 724

$blocks
 [1] 2 2 4 4 2 4 4 6 4 4 4 4 6 2 2 4 6

$sequence
 [1] "A" "B" "A" "B" "A" "B" "B" "A" "B" "A" "A" "B" "B" "A" "B" "A" "B" "A" "B" "A" "A"
[22] "B" "B" "A" "A" "B" "B" "A" "B" "B" "A" "A" "A" "A" "B" "B" "A" "B" "B" "A" "A" "B"
[43] "B" "A" "B" "B" "B" "A" "A" "A" "A" "B" "A" "B" "A" "B" "B" "A" "B" "A" "B" "A" "A"
[64] "B"
```

2. For a study with $n = 100$ and two treatment groups, let d_i be the difference of group sizes after i-th subject is randomized for $i = 1, \cdots, 100$.

2.1. (10) Find (analytically) the distribution of d_{100} if the simple randomization is used. And compute $P[d_{100} \geq 10]$.

2.2. (10) Use simulation to estimate $p = P[max(d_i) \geq 10]$ with a 95% confidence interval.

2.3. (10) Now force $d_{100} = 0$ and repeat problem **2.2**.