Download codes for this lecture at:

Lecture 6 codes: https://www.dropbox.com/s/2u26ljckbkbjcn2/Lec6.R?dl=0

A rant about basic reproductive number

Dr. Gautam Menon spoke about the basic reproductive number of an infectious disease, R_0. R_0 is the number of people an infected person will give the disease to.
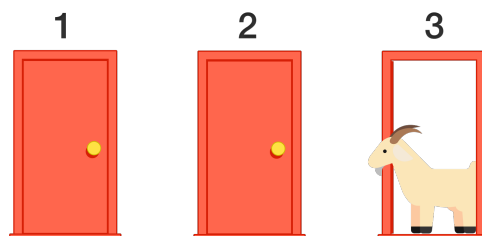
Let's consider different R_0 numbers: 0.80, 1, 1.3, 1.5, 1.8.

Suppose we live in a city where one person is found infected. For different R_0 above, let's find the number of new infections on after 30 days.

```
R0 <- .8
days <- 30

infect <- 1
for(d in 2:days)
{
  infect <- infect*R0
}
infect
```

Monte Carlo Experiments: Monty Hall Problem

You are on a game show, being asked to choose between three doors. One door has a car, and the other two have goats. After you choose a door, the host, Monty Hall, opens one of the other doors, which he knows has a goat behind it. Monty then asks whether you would like to switch your choice of door to the other remaining door. Do you choose to switch or not to switch?

Of course, whether you will switch or not depends on which action has the largest probability of winning the car (unless you like goats more than cars!). Now at first glance it seems like it would not matter whether you switched or not. However, this is not the case! We can answer this question mathematically, but you may not believe the answer.

Instead, let's try and simulate this situation on a computer. We will write an R code to repeat a Monty Hall experiment multiple times. And in each time, we will see whether switching or not switching would be more beneficial. We will then continue on to more worksheets.