STA5075: Practical 2

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There are 2 trees in the middle of the Kalahari. On each tree birds of unknown species are sitting and feeling very hot. A bird from the first tree says to those on the second tree: "Hi – if one of you come to our tree then there will be the same number of us on each tree". "Yeah, right", says a bird from the second tree, "but if one of you comes to our tree, then we will be twice as many on our tree as on yours".

Question: How many birds are on each tree? More specifically:

- Write up two equations with two unknowns.
- Solve these equations using the methods you have learned above.
- Simply finding the solution by trial–and–error is considered cheating.

My solution

Let x be the number of birds on the first tree, and let y be the number of birds on the second tree.

My two equations are as follows:

1. y + 1 = 2(x-1), so: -2x + y = -3
2. x +1 = y - 1, so: x - y = -2

```
# Solve using matrix multiplication
A <- matrix(c(-2, 1, 1, -1), ncol = 2)
b <- c(-3, -2)
x <- solve(A) %*% b
x
```

```
##      [,1]
## [1,]    5
## [2,]    7
```

```
x[1] # 5 birds on the first tree
```

```
## [1] 5
```

```
x[2] # 7 birds on the second tree
```

```
## [1] 7
```