Class 6: Functions in R

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First function. To create functions: `function_name <- function(arguments){function body}`

```
add <- function(x,y) {
  x + y
}
```

Does the function work?

```
add(3,4)
```

```
[1] 7
```

```
add(c(100,10,1), 1)
```

```
[1] 101  11   2
```

Make a function "generate_dna" that makes a random nucleotide sequence of any length.

```
bases <- c("A", "C", "G", "T")
sequence <-sample(bases, size = 10, replace=TRUE)

#`replace = TRUE` allows to sample the same letter every time, i.e. it replaces the letter ba
```

Above is my "snipet" that works. Now it can become a function.

```
generate_dna <- function(length){
  bases <- c("A", "C", "G", "T")
  sequence <-sample(bases, size = length, replace=TRUE)
  return(sequence)
}
```

```
generate_dna(10)
```

```
 [1] "G" "T" "T" "C" "G" "A" "G" "T" "T" "A"
```

```
generate_dna(12)
```

```
 [1] "C" "A" "G" "C" "G" "A" "G" "A" "T" "C" "G" "G"
```

Lets make a protein sequence generator.

```
library(bio3d)
```

```
aa <- unique(bio3d::aa.table$aa1[1:20])
aa
```

```
 [1] "A" "R" "N" "D" "C" "Q" "E" "G" "H" "I" "L" "K" "M" "F" "P" "S" "T" "W" "Y"
[20] "V"
```

```
generate_prot <- function(length){
  aa <- unique(bio3d::aa.table$aa1[1:20])
  sequence <- sample(aa, size=length, replace=TRUE)
  sequence <- paste(sequence, collapse = "")
  return(sequence)
}

#collapse puts all of the letters into one "" string
#paste will literally paste things together or paste something onto the end of each part of t
```

```
generate_prot(10)
```

```
[1] "LCTQHRNCEE"
```

Generate random protein sequences of **length 6 to 12**. To do this use the function `sapply()`.

```
prot_seqs <- sapply(6:12, generate_prot)
```

Format our sequences as fasta files.

```r
cat(paste(">id.", 6:12, "\n", prot_seqs, sep=""), sep="\n")
```

```
>id.6
GYSPHT
>id.7
GNWDHCL
>id.8
PSLNITQD
>id.9
FFEANHWQD
>id.10
WWIIVDMKMP
>id.11
GFLMASAEEAL
>id.12
KSETWPMILKHC
```

```r
# the "\n" means return to next line
```