Constants (in scientific numeric notation):

```
299792458 -> SPEED_OF_LIGHT # in meter/second
paste("Speed of light [m/s] =",format(SPEED_OF_LIGHT,sci=T), "[m/s]")
31536000 -> YEAR_IN_SECONDS # in seconds
paste("Year in seconds =",format(YEAR_IN_SECONDS, sci=T),"[s]")
```

```
[1] "Speed of light [m/s] = 2.997925e+08 [m/s]"
[1] "Year in seconds = 3.1536e+07 [s]"
```

- Recall: speed [m/s] * time [s] = distance*[m]

How far does light travel in one year?

```
SPEED_OF_LIGHT * YEAR_IN_SECONDS -> ly
paste("1 light-year [LY] =",format(ly,sci=T), "[m]")
```

```
[1] "1 light-year [LY] = 9.454255e+15 [m]"
```

- Conversion: x [m] = y * ly [m] => y = x/ly

How high is the Empire State Building in light-years?

```
380 -> x # height in [m] is given, y = x/ly is sought
paste(x,"[m] =",x/ly,"light-years.")
```

```
[1] "380 [m] = 4.0193542673547e-14 light-years."
```

- Now, the complete script can be tangled as `convert.R` and run on a shell like a C program with `Rscript` instead of the `gcc` compiler.

The complete R script

- Tangle the code below (`C-c C-v t`) to a file `convert.R`
- Open a shell (`M-x eshell`) and run `Rscript convert.R`

```
299792458 -> SPEED_OF_LIGHT # in meter/second
paste("Speed of light [m/s] =",format(SPEED_OF_LIGHT,sci=T), "[m/s]")
31536000 -> YEAR_IN_SECONDS # in seconds
```

```
paste("Year in seconds =",format(YEAR_IN_SECONDS, sci=T),"[s]")
SPEED_OF_LIGHT * YEAR_IN_SECONDS -> ly
paste("1 light-year [LY] =",format(ly,sci=T), "[m]")
380 -> x # height in [m] is given, y = x/ly is sought
paste(x,"[m] =",x/ly,"light-years.")
```

```
[1] "Speed of light [m/s] = 2.997925e+08 [m/s]"
[1] "Year in seconds = 3.1536e+07 [s]"
[1] "1 light-year [LY] = 9.454255e+15 [m]"
[1] "380 [m] = 4.0193542673547e-14 light-years."
```