R code for question 1

```
setwd('~/Desktop/Matematik og modeller/mod1/proj1')

library(tidyverse)
```

```
## ── Attaching packages ─────────── tidyverse 1.2.1 ──
```

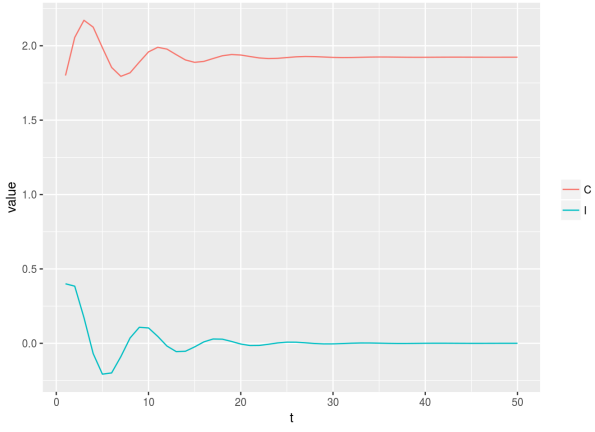
```
## ✔ ggplot2 2.2.1     ✔ purrr   0.2.4
## ✔ tibble  1.4.2     ✔ dplyr   0.7.4
## ✔ tidyr   0.8.0     ✔ stringr 1.3.0
## ✔ readr   1.1.1     ✔ forcats 0.3.0
```

```
## ── Conflicts ──────────── tidyverse_conflicts() ──
## ✖ dplyr::filter() masks stats::filter()
## ✖ dplyr::lag()    masks stats::lag()
```

```
library(xtable)

sim_mod <- function(move, n, x1) {

  xs <- matrix(nrow = n, ncol = length(x1))
  xs[1,] <- x1
  for (t in 1:(n-1)) {
    xs[t+1,] <- move(xs[t,])
  }

  sim <- data_frame(t = 1:n, C=xs[,1], I=xs[,2])
  plt <- sim %>%
    gather(key, value, C, I) %>%
    ggplot(aes(t, value, color=key)) +
    geom_line() +
    theme(legend.title = element_blank())

  list('sim' = sim, 'plt' = plt)

}

make_matrix <- function(a,b,c) {
  matrix(c(a, (a-1)*c, a, a*c), ncol = 2)
}

a <- 0.48
b <- 1
c <- 1.5
A <- make_matrix(a,b,c)
A
```

```
##       [,1] [,2]
## [1,]  0.48 0.48
## [2,] -0.78 0.72
```

```
move <- function(x) {
  A%*%x + c(b, b*c)
}

n <- 50
x1 <- c(1.8,0.4)
sim <- sim_mod(move, n, x1)

sim[['plt']]
```




```
sim[['sim']][(n-5):n,]
```

```
## # A tibble: 6 x 3
##       t     C          I
##   <int> <dbl>      <dbl>
## 1    45  1.92 -0.000291
## 2    46  1.92 -0.000279
## 3    47  1.92 -0.000126
## 4    48  1.92  0.0000502
## 5    49  1.92  0.000151
## 6    50  1.92  0.000145
```

```
print(xtable(sim[['sim']][(n-5):n,], digits=6), file='q1tbl.tex')
```