

## R Homework: basic language structure (ifelse, where, looping)

1. The Fibonacci numbers are the sequence of numbers defined by the linear recurrence equation  $F_n = F_{n-1} + F_{n-2}$  where  $F_1 = F_2 = 1$  and by convention  $F_0 = 0$ .

For example, the first 8 Fibonacci numbers are 1, 1, 2, 3, 5, 8, 13, 21.

a) For a given n, compute the  $n^{\text{th}}$  Fibonacci number using a for loop

b) For a given n, compute the  $n^{\text{th}}$  Fibonacci number using a while loop

c) For a given n, compute the  $n^{\text{th}}$  Fibonacci number using a repeat loop

Print the the 15<sup>th</sup> Fibonacci number obtained from each of the code written above.

Hint: You can create a function taking n as argument. Alternatively, write the code for n=15.

2. Create a vector x by generating 10 numbers from N(0,1) distribution.

a) In R compute the mean and standard deviation of these numbers not using any standard functions available.

b) Create a vector v as follows:

$v[i]=0$  if  $x[i]<0$  and  $v[i]=1$  if  $x[i] \geq 0$ ,  $i=1,\dots, 10$