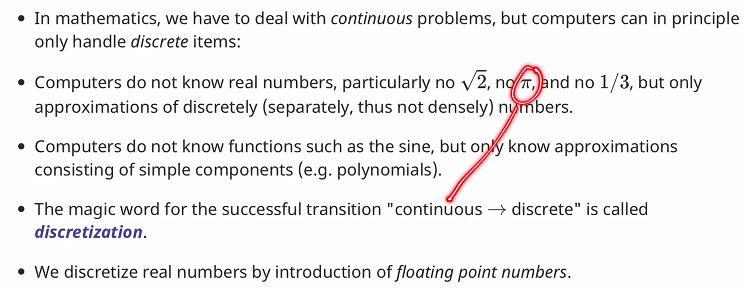
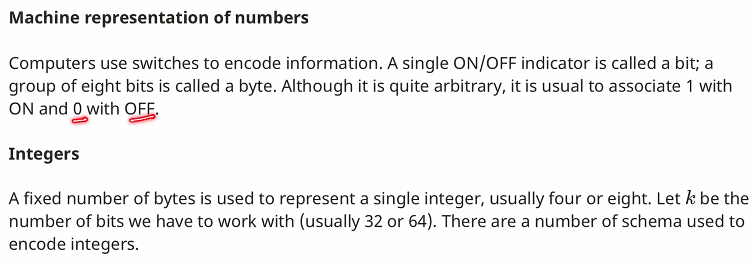
# Motivation Numerical Analysis

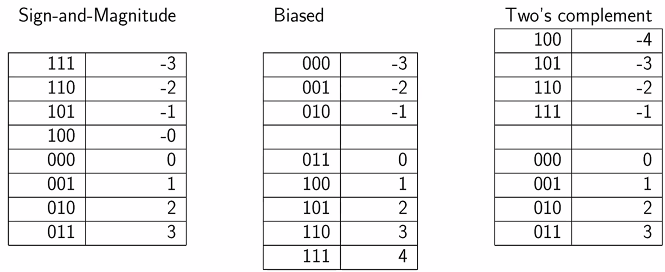


**Numerical accuracy and program efficiency (spuRs Ch.9)**

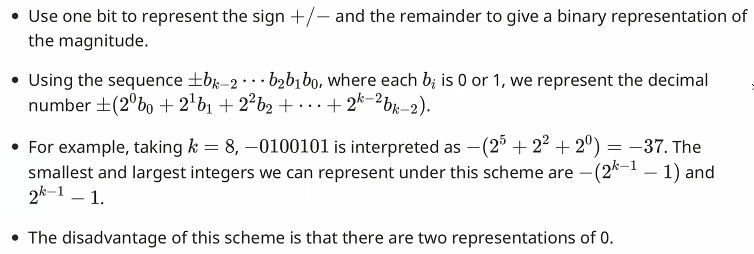


* 8 bits = 1 byte (b vs B)
* 1 GB -> 2^30 bits

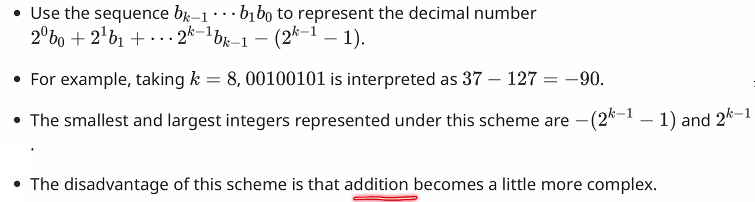
## Ex: k = 3



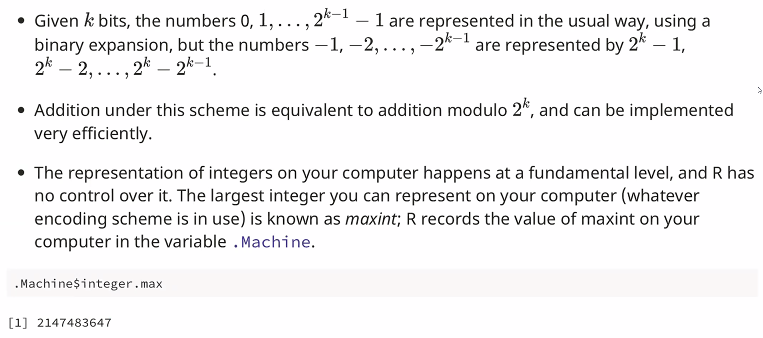
# Sign and magnitude scheme

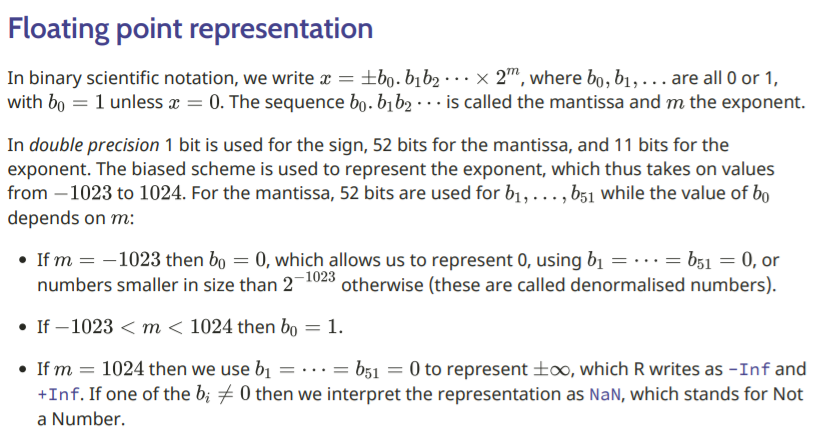


# Biased scheme

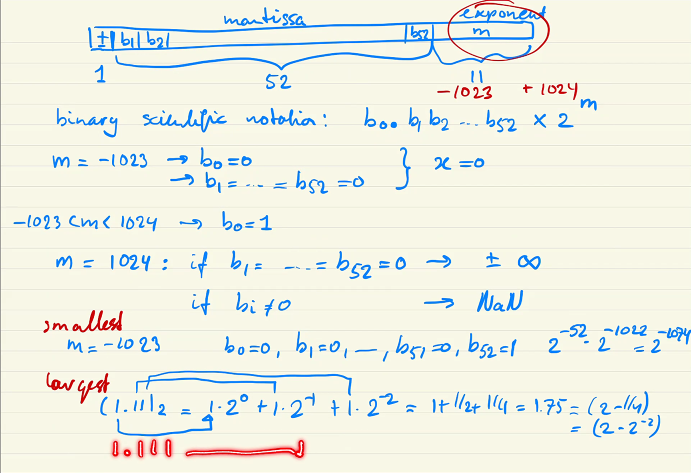


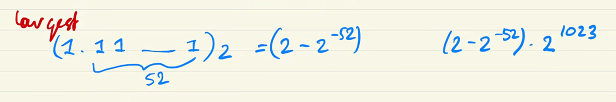
# Two’s complement scheme

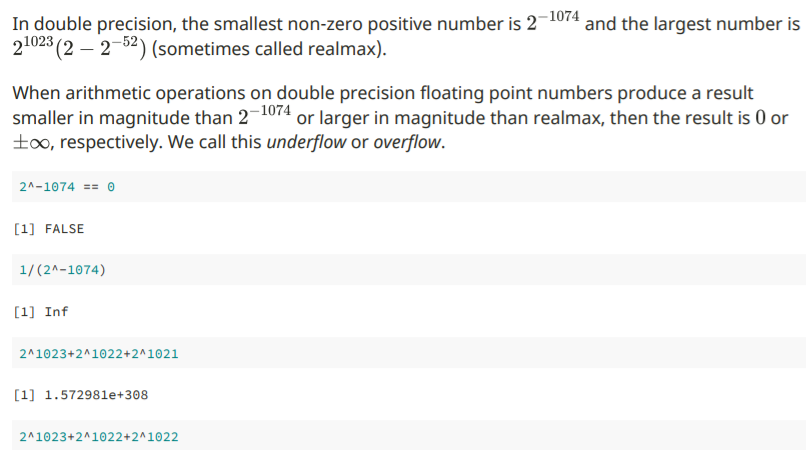


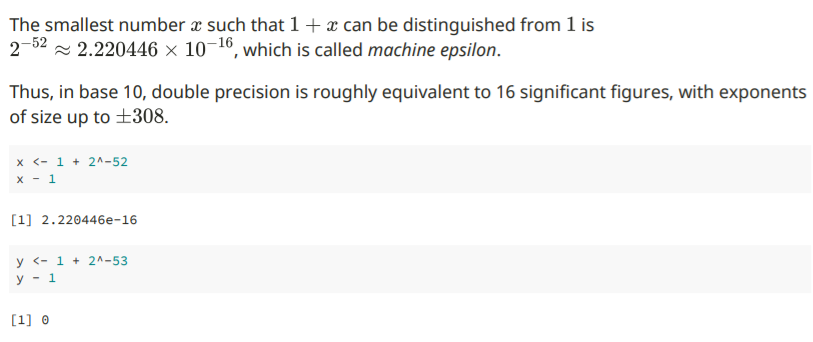


* Note: b\_51 is actually b\_52

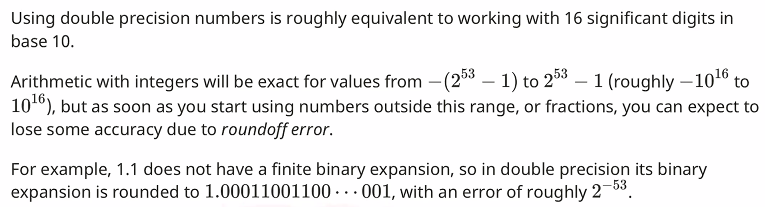




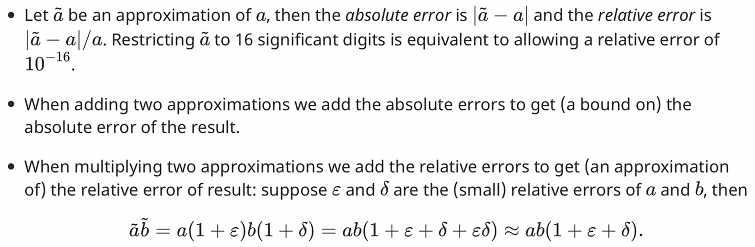


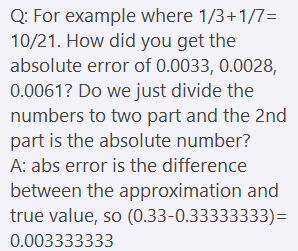


# Significant digits

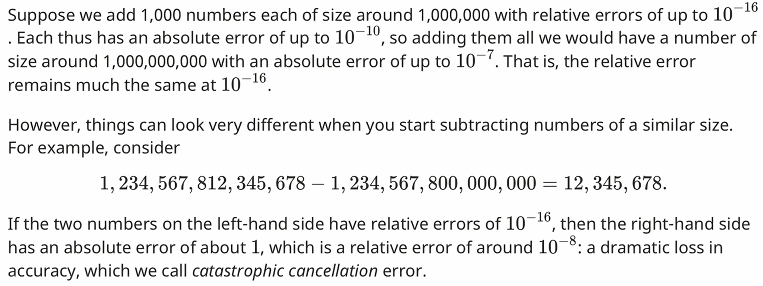


# Absolute and Relative Error

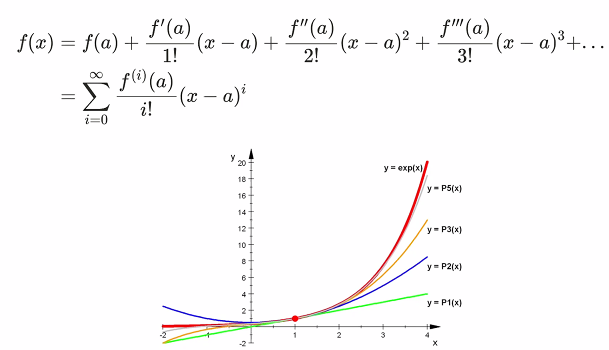
****

****

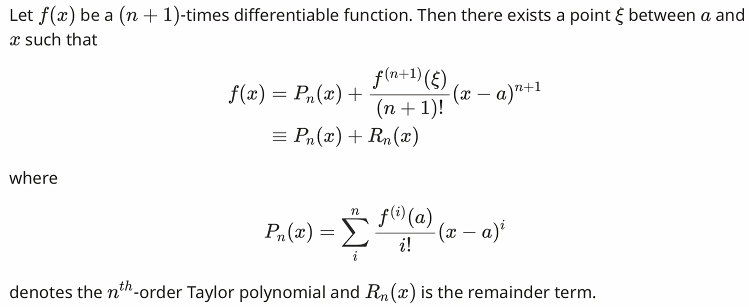
**Catastrophic Cancellation**

****

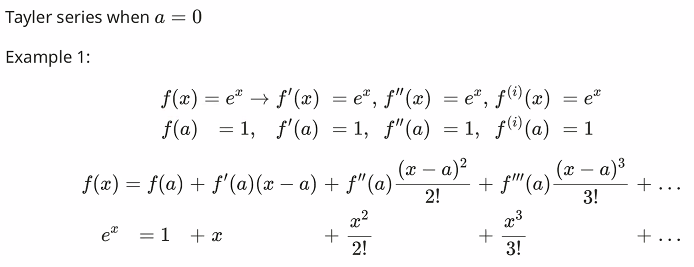
**Taylor series (approx. of f(x) in the point a when f(x) is infinitely differentiable)**

****

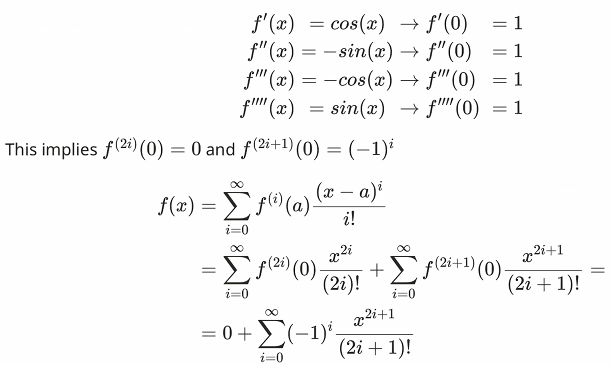
**Taylor’s Theorem**

****

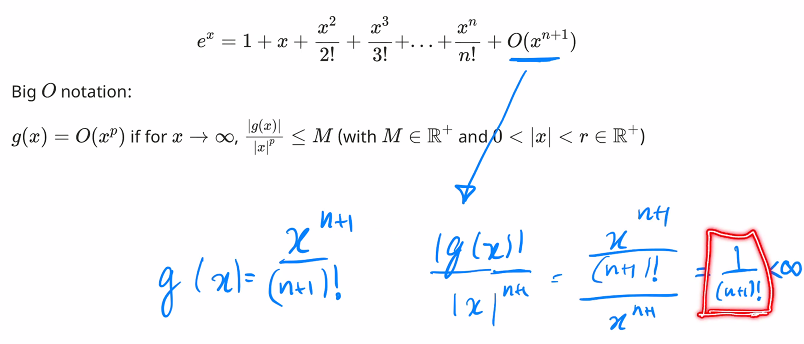
**McLaurin series**

****

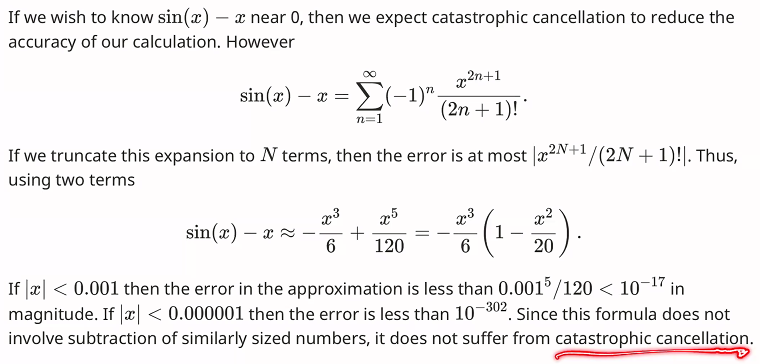
*Example 2: f(x) = sin(x)*

**

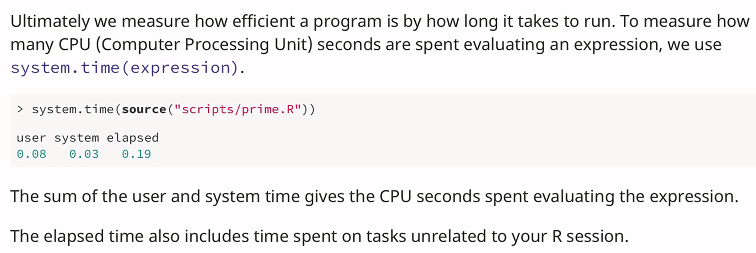
**Taylor series approx. (with a finite # of terms)**

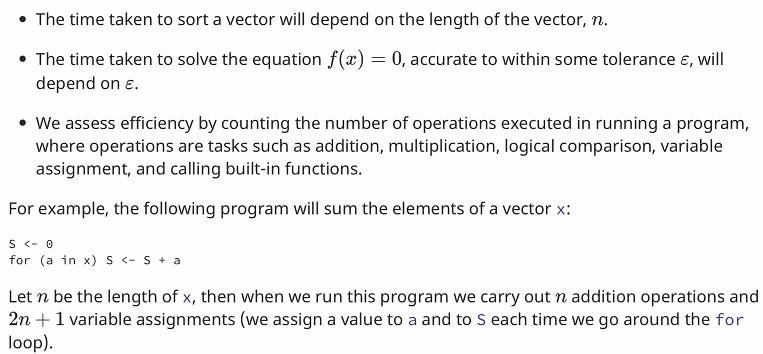
****

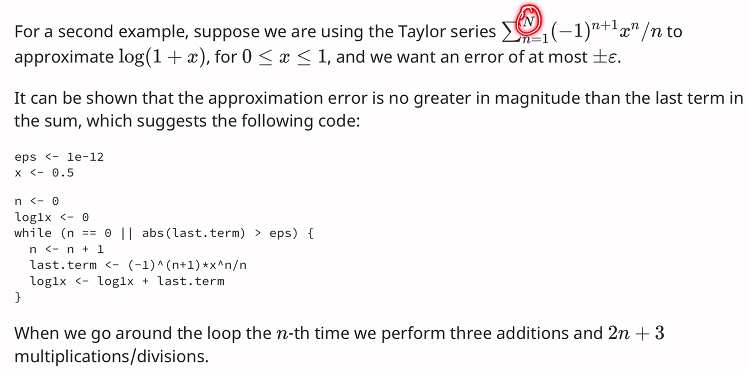
### Example: sin(x) – x near O

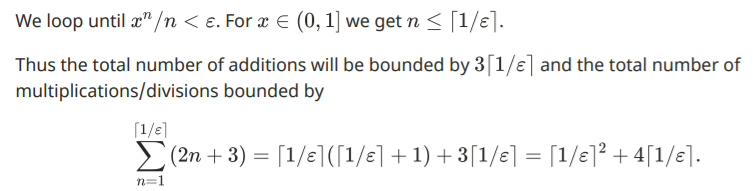
****

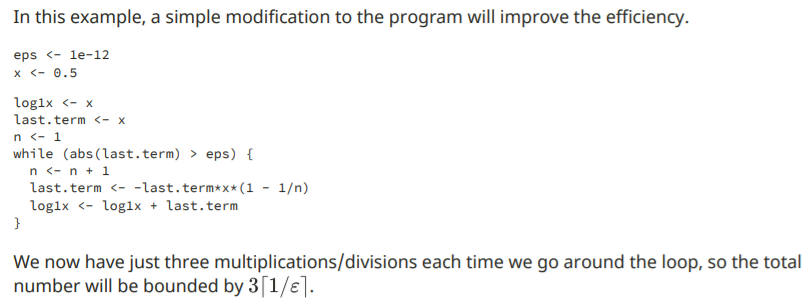
**Time**

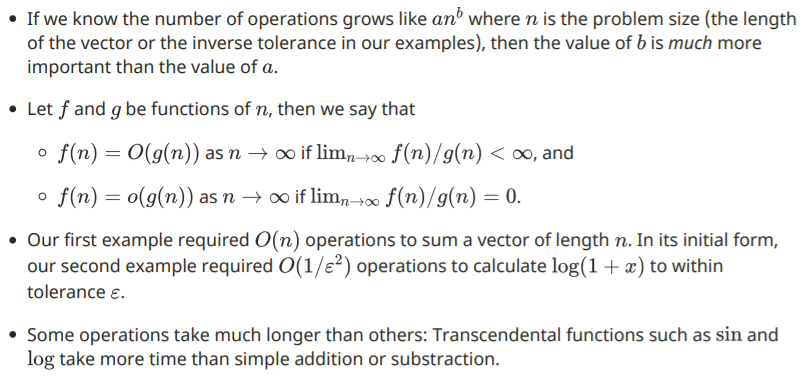
****

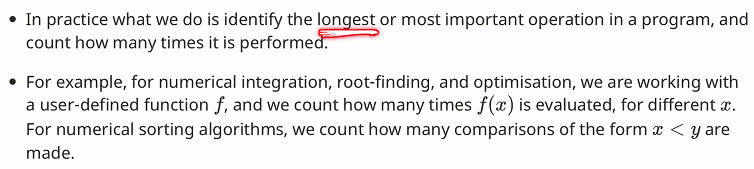
****

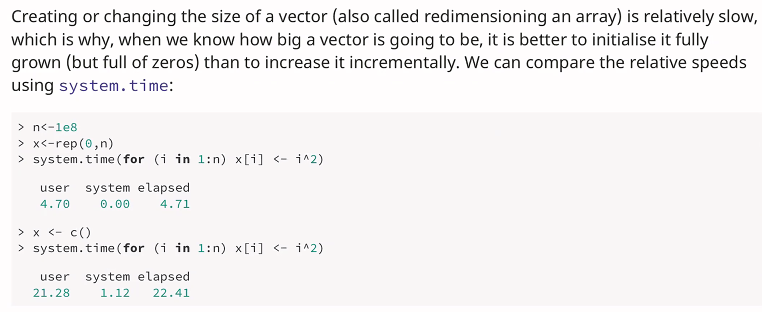
****

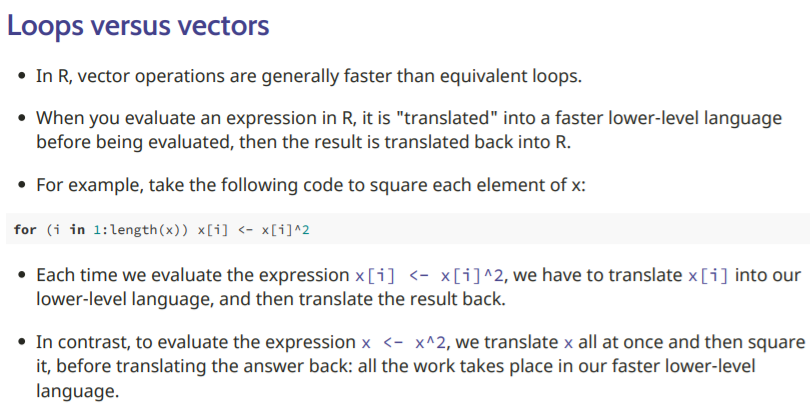
****

****

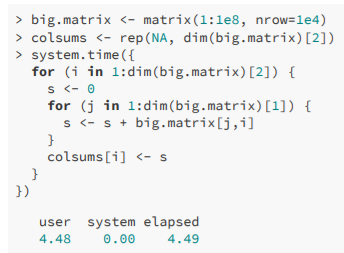
****

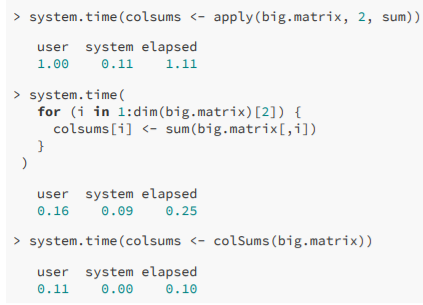
****

****

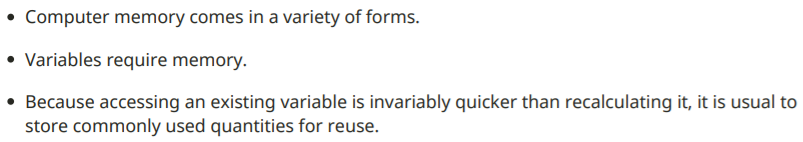
****

### Example: column sums of a matrix

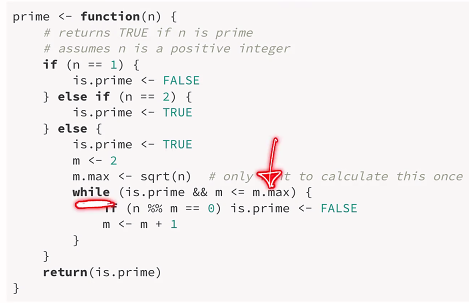


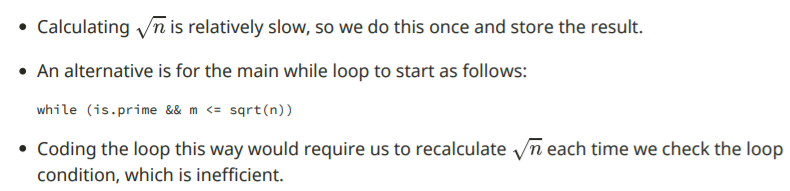


**Memory**

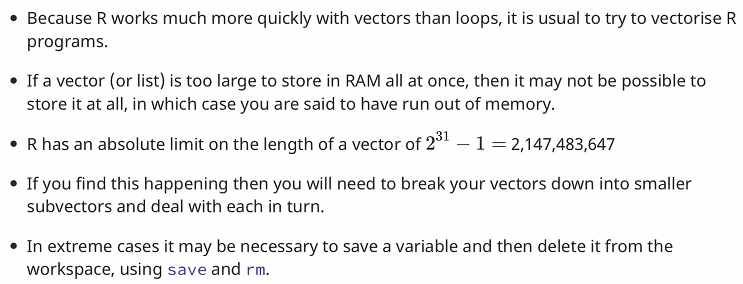
****

### Example: function “prime”

****

****

**Summary**

****