

STAT2005 Programming Languages for Statistics
Assignment 2
Due: 28 February 2025

1. Consider the built-in data frame `pressure`.

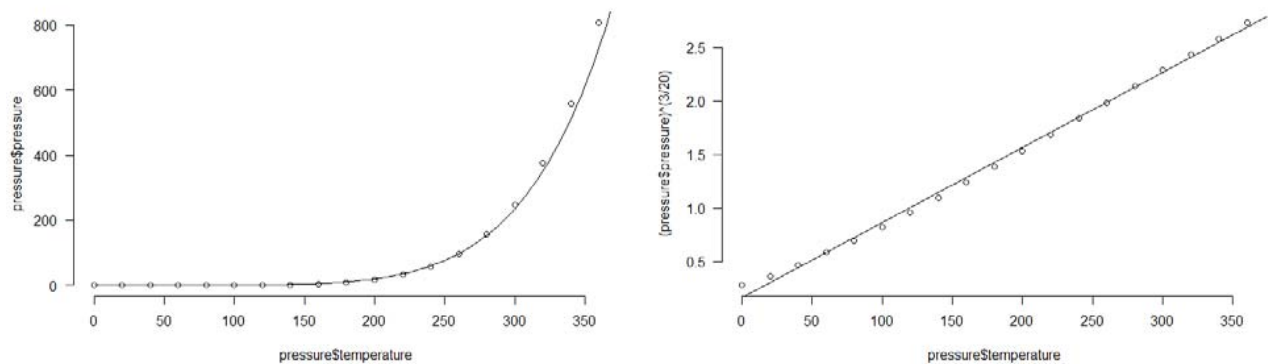
(a) Plot pressure against temperature, and use the following command to pass a curve through these data:

```
curve((0.168 + 0.007*x)^(20/3), from = 0, to = 400, add = TRUE)
```

(b) Now, apply the power transformation $y^{3/20}$ to the pressure data values. Plot these transformed values against temperature. Is a linear or nonlinear relationship evident now? Use the `abline()` function to pass a straight line through the points. (You need an intercept and slope for this – see the part (a) of this question to obtain appropriate values.)

(c) Add a suitable title to the graph.

(d) Re-do the above plots, but use the `mfrow()` function to display them in a 1×2 layout on the graphics page. Suppress the surrounding box and arrange the numeric axis labels to be horizontal. A sample output is given below. (see `help(par)`)

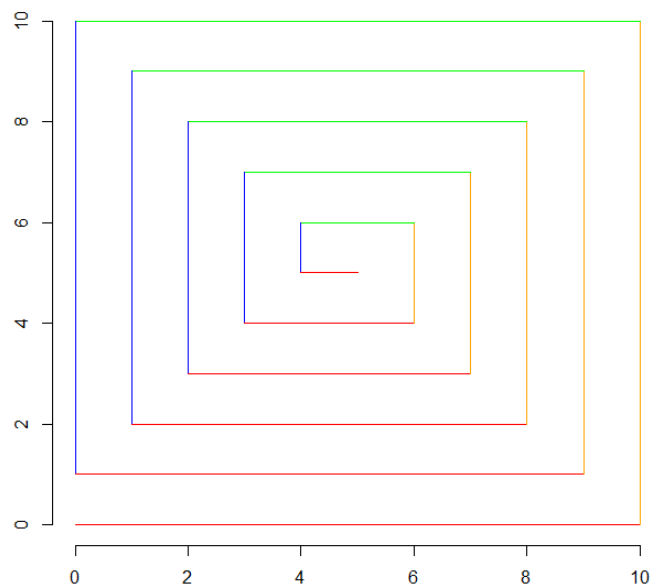


2. Write a function named `alt_matrix()` which accept a positive integer `n` and return a square matrix with alternating 0 and 1 as shown below.

```
> alt_matrix(7)
```

	[,1]	[,2]	[,3]	[,4]	[,5]	[,6]	[,7]
[1,]	0	1	0	1	0	1	0
[2,]	1	0	1	0	1	0	1
[3,]	0	1	0	1	0	1	0
[4,]	1	0	1	0	1	0	1
[5,]	0	1	0	1	0	1	0
[6,]	1	0	1	0	1	0	1
[7,]	0	1	0	1	0	1	0

3. Use R to draw the following graph.



Note: the four colours are "red", "orange", "green", and "blue".

4. A twin prime is a pair of primes (x, y) , such that $y = x + 2$. Construct a vector of all twin primes less than 1000.

You should submit a file `asg2.r` via Blackboard, which contains all the R codes you use to finish this assignment. The codes should be commented as clearly as possible. Written work (if any) should also be attached.