STAT40730
Data Programming with R (Online).
Lab 2: vectors, matrices and arrays.

1. Create a vector called x of the even numbers from 2 to 10. Try doing it three different ways: using `c()`, using `vector()` and then square brackets, and using `seq()`.

2. Append the numbers 12 and 14 to the end of your vector `x`. Then remove all of the numbers in it that are divisible by 4. The vector `x` should now be of length 4. Multiply your vector by 2, then add the vector `y = 4:3`. Why does this not give an error? Store the result in a new vector `z`.

3. Write some code to determine if any of the values in `z` are less than 25. Write some code (using `subset`) to determine all the values in `z` that are divisible by 4. Use which to find which elements of `z` are less than 20.

4. Create a matrix via the command `M <- matrix(1:16, 4, 4)`. Write code to access the first row, the second column, and the two elements that are in the second and third row and fourth column.

5. What does the command `apply(M, 1, sd)` give? Replace the value in the bottom right hand corner of `M` with the value `NA`. Re-run the apply command what happens? Add an extra argument to the apply command (hint: look the help for `sd`) which removes the `NA` value.

6. Take the findruns function and change it so that it looks for runs of zeros instead of ones. Change it again to find runs of any non-zero number.

7. Install and load in the `pixmap` package (as in the lecture 2 `R` code file). Check that you can create the image and manipulate it as in the code. Try your own manipulations and see what you can create. Note: you will need to be running Rstudio on your own laptop or through a USB stick to complete this task.