

# STAT40180/STAT40620

## Data Programming.

### Lab 2: vectors, matrices and arrays.

1. Install and load in the `pixmap` package. An R package is a collection of functions and/or datasets. When you use a package for the first time, you have to install it. You can do it by typing: `install.packages("...")` (where `...` is the name of the package you want to install, in this case `pixmap`), or clicking on the following:

- R for Windows: packages - install package(s)
- R for Mac: Packages & Data - Package Installer - Get List
- RStudio: Tools - install packages

and select the package you want to install. More details are in the screencast `Lecture_2_SC4.mp4` available in the **Week 2** folder on Blackboard.

2. 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()`.
3. 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.

Read from page 20 to 26 of `Lecture_2.html`, and watch the video `Lecture_2_SC2.mp4` available in the **Week 2** folder on Blackboard, to answer the following questions:

4. 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`.
5. 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.

Read from page 27 to 43 of `Lecture_2.html`, and watch the videos `Lecture_2_Video_Slides_27_35.mp4` and `Lecture_2_Video_Slides_36_43.mp4` available in the **Week 2** folder on Blackboard, to answer the following questions:

6. 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.
7. 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.
8. Load in the `pixmap` package. Check that you can create the image and manipulate it as in the code. Try your own manipulations and see what you can create.