# STAT40180/STAT40620
# Data Programming.
# Lab 6: R Programming Structures

1. Use the function `isprime` in the package `gmp` to print out the first 50 prime numbers using a `for` loop, a `while` loop and a `repeat` loop.

2. Have a look at the `painters` data in the `MASS` library. Use appropriate boolean/if/ifelse statements to answer the following questions:

   (a) What's the difference between these two?

   ```
   painters$Colour > 15 | painters$Expression > 15
   painters$Colour > 15 || painters$Expression > 15
   ```

   (b) How many painters have a Colour or Expression score bigger than 15?

   (c) How many painters have all scores bigger than 10?

3. Define an elite painter as one who has a total score greater than 30. Create a new variable using an `ifelse` statement to discover the number of elite or non-elite painters.

   **NOTICE**: The material to answer the following questions will be explained during the lecture on Thursday 25th October.

   **NOTICE**: To answer questions 4 and 5 you have to create recursive functions as explained in slide 29 of Lecture 6.

4. Write a recursive function that calculates the double factorial of an odd number (see `mathworld.wolfram.com/DoubleFactorial.html` for the formula for this). Include an `if` statement to turn the argument into an odd number if an even number is mistakenly given as the argument.

5. Write a recursive function to create the first $n$ Fibonacci numbers.

   **NOTICE**: Question 6 is based on the example in slides 34-39 of Lecture 6.

6. Change the logistic regression likelihood example to run on mother's weight rather than age. Change it again to see if you can predict painters from school A from their composition, drawing, colour or expression scores.