CS-150 Worksheet 1
Number Systems

This lab is about getting familiar with base conversions and binary arithmetic. Complete each of the follow tasks, remembering to provide your working.

☐ Task 1.1 – Decimal (base 10) to base x

i. Convert the following to binary:

- 12
- 9002

ii. Convert the following to octal:

- 341
- 55

iii. Convert the following to hexadecimal:

- 150
- 2019

☐ Task 1.2 – Base x into decimal

i. Convert the following from binary:

- 1101110110
- 100101

ii. Convert the following from hexadecimal:

- AB23
- 39F

☐ Task 1.3 – Addition in binary

i. Calculate the following additions (no limit of word size):

- 101010 + 11010
- 11101101 + 1111011

☐ Challenge Task

Write a program, in either Java or Python, which implements the base conversion algorithm for integers via the repeated division method given in the lectures. Try extending this to allow for the conversion of a real number. You might want to make use of the **division** and **modulo** operators.