COMP21111 Assignment 3
20 marks

Show your working.

Deadline: 22th Oct., time: 12:00, SSO
Deadlines are strict

Problem 1 (7 marks)

Apply the standard CNF transformation to the formula $(p \leftrightarrow \neg q) \rightarrow r$.
Is the resulting formula equivalent to the initial formula?

Problem 2 (9 marks)

Convert the formula $\neg r \wedge p \leftrightarrow (p \leftrightarrow q) \rightarrow r$ into clausal normal form using definitional transformation.

Problem 3 (4 marks)

The 2-pigeonhole problem 2-PHP(n,m) is the following problem: Given $n \geq 1$ objects and $m \geq 1$ boxes check whether it is possible to place objects into the boxes such that *no box would contain more than two objects.*

Formalise the 2-pigeonhole problem as a propositional satisfiability problem.
(Hint: use propositional variables p_{ij} for to represent that ith object is in jth box for $1 \leq i \leq n$ and $1 \leq j \leq m$.)