Constraint Graph

- Nodes in the constraint graph represent courses which have variables L1, L2,..., Ln where n is number of lectures, T1, T2,..., Tm where m are the number of tutorials and P1, P2,..., Pk where k are the number of laboratory practicals

- The domain of each variable is tuple (d, s, c) where d is the day [1..7], s is the slot on the day[1..7] and c is either lecture hall number[1..5] or laboratory number [6..10]

NOTE : These constraints are for the data given in the problem statement

Constraint - 1 : Labs in AN
Allowed combinations. ['X' is don't care]
C_01 : P - (X, X, [5,6,7])
C_02 : P - (X, X, [5,6,7])
C_03 : P - (X, X, [5,6,7])
C_04 : P - (X, X, [5,6,7])
C_05 : P - (X, X, [5,6,7])
C_06 : P - (X, X, [5,6,7])

Constraint - 2: Labs are consecutive
Allowed combinations. ['X' is don't care, 'Y' is any variable]
C_01 : P - (X, X, Y) (X, X, Y + 1) (X, X, Y + 2)
C_02 : P - (X, X, Y) (X, X, Y + 1) (X, X, Y + 2)
C_03 : P - (X, X, Y) (X, X, Y + 1)
C_04 : P - (X, X, Y) (X, X, Y + 1)
C_05 : P - (X, X, Y) (X, X, Y + 1) (X, X, Y + 2)
C_06 : P - (X, X, Y) (X, X, Y + 1) (X, X, Y + 2)

Constraint - 3: Lectures and Tutorial not on same day
Allowed combinations. ['X' is don't care, 'Y', 'Z' is variables which are unequal]
C_07 : L - (Y, X, X) T - (Z, X, X)
C_08 : L - (Y, X, X) T - (Z, X, X)
C_09 : L - (Y, X, X) T - (Z, X, X)
C_10 : L - (Y, X, X) T - (Z, X, X)

Constraint - 4: No two DC for a program together
These courses can't be of the form (Y, X, X) and (Y + 1, X, X) where 'X' is don't care and 'Y' is a variable
Program A
C_01 C_02 C_09
Program B
C_03 C_04 C_08
Program C
C_05 C_06 C_10

Constriant - 5: GE courses not on the same day
These courses can't be of the form (Y, X, X)
C_11 C_12

Constriant - 6: Atmost one lecture of a course on a day
The L's of these courses can't be of the form (Y, X, X)
C_01 C_02 C_03 C_04 C_05 C_06 C_07 C_08 C_09 C_10 C_11 C_12

Constriant - 7: Two laboratory sessions for practical courses
These courses will have P1, P2, ... , P2*k variables where k is the number of laboratory sessions
C_01 C_02 C_03 C_04 C_05 C_06

Constraint - 8: Prof-4 not on Thursday and Prof-1 during {1,2,3} slots only
These courses will be of the form (4, X, X)
C_10 C_11
These courses will be of the form (X, [1,2,3], X)
C_01 C_08

Constraint - 9: Lectures of professors should not be in succession
These courses can't be of the form (Y, X, X) and (Y + 1, X, X)
C_01 C_08
C_04 C_05
C_10 C_11
C_02 C_07
C_06 C_12

Constraint - 10: No clash in any student package

No two of these courses in a line can be of the form (Y, Z, X) - Package for program A

DC : C_01 C_02 C_09 | DE : C_03 C_06 | GE : C_11
DC : C_01 C_02 C_09 | DE : C_03 C_06 | GE : C_12
DC : C_01 C_02 C_09 | DE : C_03 C_07 | GE : C_11
DC : C_01 C_02 C_09 | DE : C_03 C_07 | GE : C_12
DC : C_01 C_02 C_09 | DE : C_06 C_07 | GE : C_11
DC : C_01 C_02 C_09 | DE : C_06 C_07 | GE : C_12

No two courses can be of the form (Y, Z, X) - Package for program B

DC : C_03 C_04 C_08 | DE : C_09 C_10 | GE : C_11
DC : C_03 C_04 C_08 | DE : C_09 C_10 | GE : C_12

No two courses can be of the form (Y, Z, X) - Package for program C

DC : C_05 C_06 C_10 | DE : C_01 C_04 | GE : C_11
DC : C_05 C_06 C_10 | DE : C_01 C_04 | GE : C_12
DC : C_05 C_06 C_10 | DE : C_01 C_07 | GE : C_11
DC : C_05 C_06 C_10 | DE : C_01 C_07 | GE : C_12
DC : C_05 C_06 C_10 | DE : C_01 C_08 | GE : C_11
DC : C_05 C_06 C_10 | DE : C_01 C_08 | GE : C_12
DC : C_05 C_06 C_10 | DE : C_04 C_07 | GE : C_11
DC : C_05 C_06 C_10 | DE : C_04 C_07 | GE : C_12
DC : C_05 C_06 C_10 | DE : C_04 C_08 | GE : C_11
DC : C_05 C_06 C_10 | DE : C_04 C_08 | GE : C_12
DC : C_05 C_06 C_10 | DE : C_07 C_08 | GE : C_11
DC : C_05 C_06 C_10 | DE : C_07 C_08 | GE : C_12

Constraint - 11: No clash in professor package

No two of these courses in a line can be of the form (Y, Z, X)

C_01 C_08
C_04 C_05
C_10 C_11
C_02 C_07
C_06 C_12