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AIR Assignment - 04

Aim:- Constraint satisfaction problems: Implement Graph colouring problem.

Objectives:- 1) To understand constraint satisfaction problem.
2) To implement graph colouring problem.

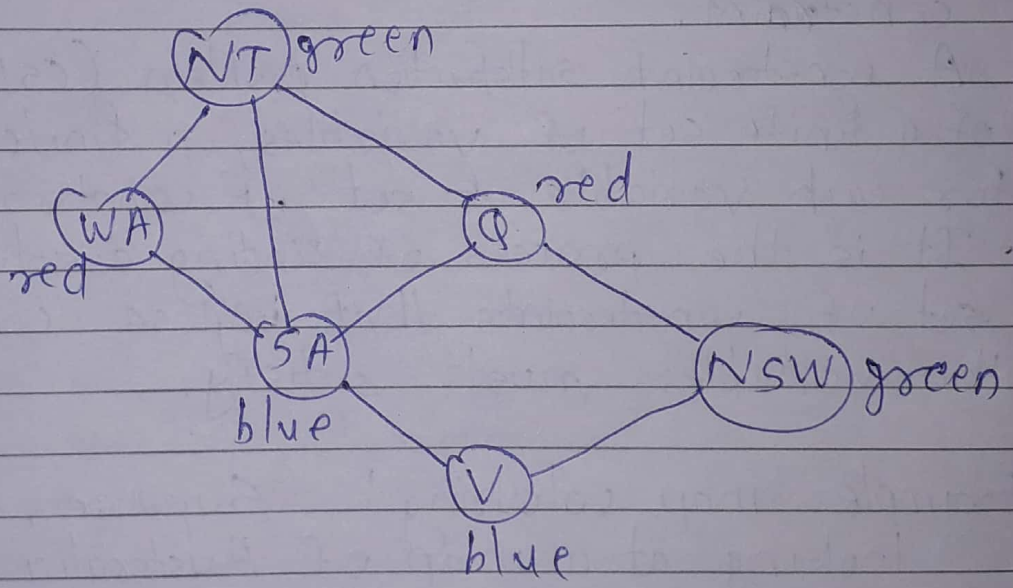
Theory:-

- Constraint satisfaction Problem:-
  - The class of problem where search space is constraint.
  - A constraint satisfaction problem (CSP) consists of a finite set of variables, a finite domain for each variable & set of constraints.
  - It is the process of finding a solution to the set of constraints that impose conditions that the variables must satisfy.

- Example - map colouring:- Suppose, we are looking at a map of Australia showing each of it's states & territories & that we are given a task of coloring each region either red, green or blue in such a way that no neighbouring region have same color.
  To formulate, this as a CSP, we define variables to be the region:
  WA, NT, Q, NSW, V, SA, T.
  The domain of each variable is the set {red, green, blue}. The constraint requires neighbouring regions to have distinct colors.

- Variables - WA, NT, Q, NS, W, U, SA, T
- Domain - {Red, Green, Blue}
- Constraints - Adjacent regions must have different colors.
  Ex. WA ≠ NT or (WA, NT) in
  (red, green), (red, blue), (green, red)
  (green, blue), (blue, red), (blue, green)

- Constraint graph:-
  The nodes of graph corresponds to variables of the problem & the arcs connected to constraints.



Conclusion:- From this assignment, we have learnt concept of constraint satisfaction problem & implemented graph coloring problem.