Graph Coloring / Exam Scheduling Project

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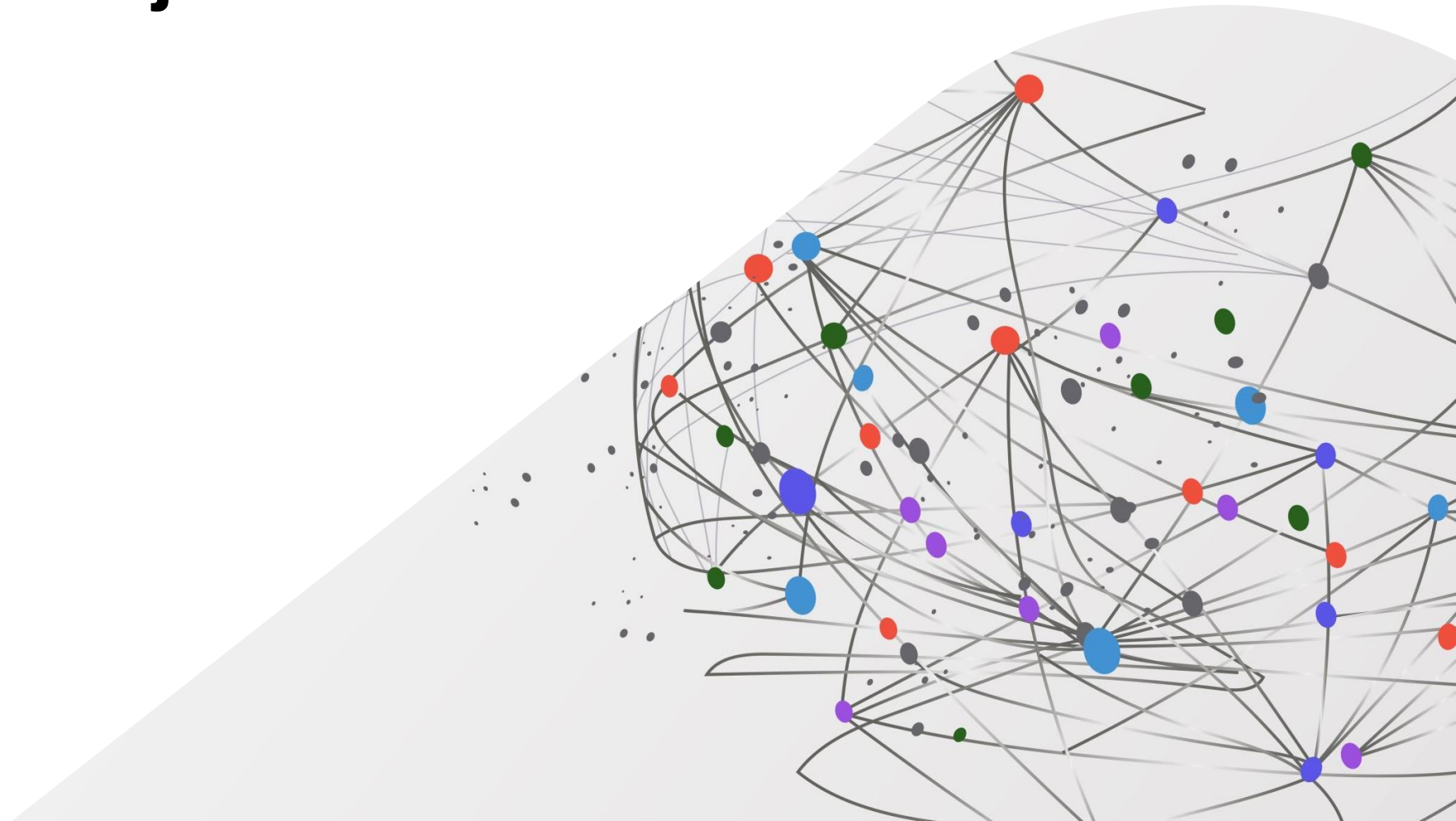
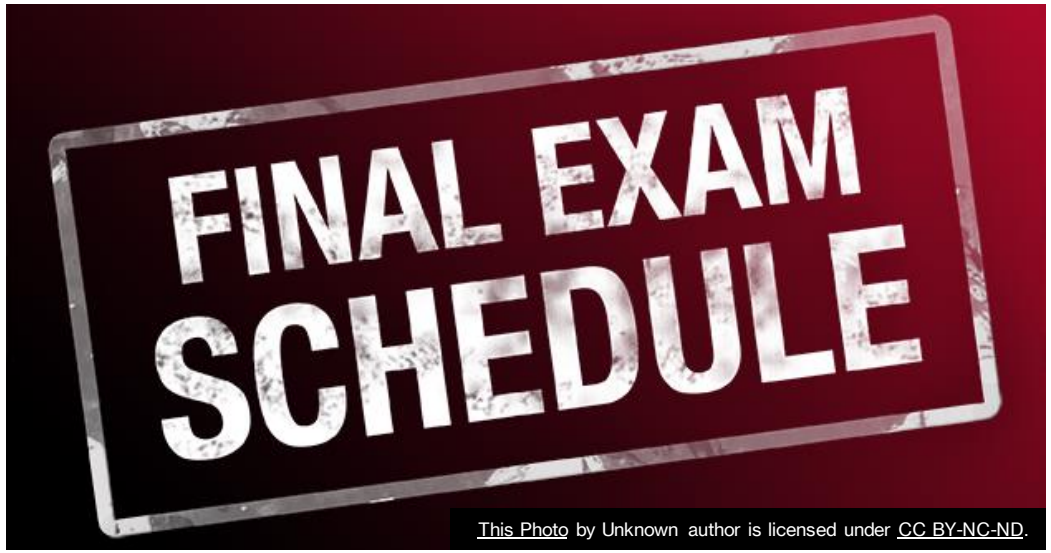


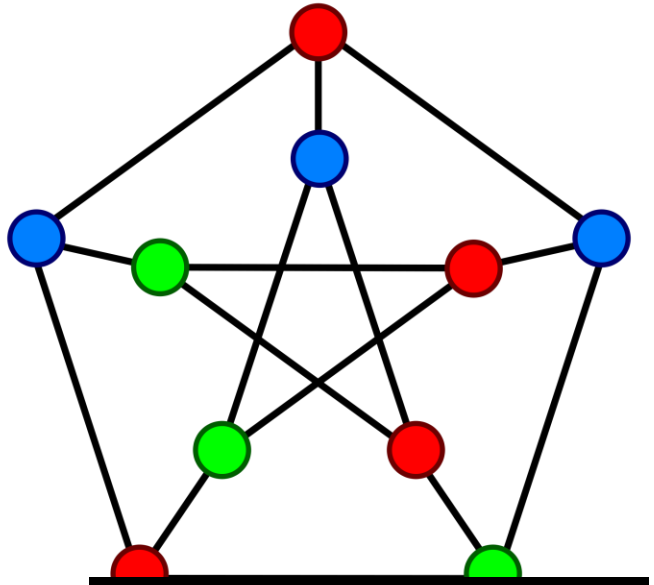
What is Exam Scheduling?

- Exam scheduling is a problem that every university needs to solve in the final period.
- The problem as follows:
  - There is a fair amount of courses.
  - In each course, there are several students that takes the course.
  - A student can take multiple courses there is an upper threshold.
  - If two courses have taken by the same student, their exam schedule must be different.



Graph Coloring & Exam Scheduling

- In exam scheduling, each course represents a node.
- If a student takes two courses than there is an edge between these courses/nodes.
- After generating the graph, graph coloring algorithms will be used to find how many exam slots are needed.
- In graph coloring, each color represents an exam slot.
- Same colored courses/nodes can schedule their exam in the same slot.



Algorithms and Technologies To be Used

- Graph Coloring Algorithms: Graph coloring problem is an NP-Complete Problem. As a result, two types algorithms will be used. Brute force algorithms to acquire a correct solution and Heuristic algorithms to solve it in polynomial time with a high probability to find a correct solution.
- Technologies to be used: To generate algorithms, C++ will be used as a coding language for the representation part either Python or JavaScript will be used.

Optional Further Work

- Map coloring is another application of graph coloring.
- Map coloring is coloring every country/state so that no adjacent country/state will have the same color.
- If time permits, map coloring algorithm will be implemented using 5 coloring algorithm.
- The representation of the map coloring algorithm will be illustrated in a world map.