Lecture 2: Why graphs?

A cartographer’s problem

Graph specified by nodes and edges.

node = country
edge = neighbors

Graph coloring problem: color nodes of graph with as few colors as possible, so that there is no edge between nodes of the same color.

Exam scheduling

The registrar’s problem

Schedule final exams:
- use as few time slots as possible
- can’t schedule two exams in the same slot if there’s a student taking both classes.

This is also graph coloring!

Node = exam
Edge = some student is taking both endpoint-exams
Color = time slot
Animal crossing

Animals need to be ferried across a river
- Use as few boats as possible
- Cannot put two animals in the same boat if one will eat the other

This is, yet again, graph coloring!

Node = animal
Edge = one endpoint-animal will eat the other
Color = boat