Discrete Math

State Diagrams 2

CS 173

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UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Department of Computer Science

ICES Evaluations

Open on August 1st

Please provide comments about both positive aspects and ways to improve

Please fill out twice — once for Brad and once for Calvin

Learning Objectives

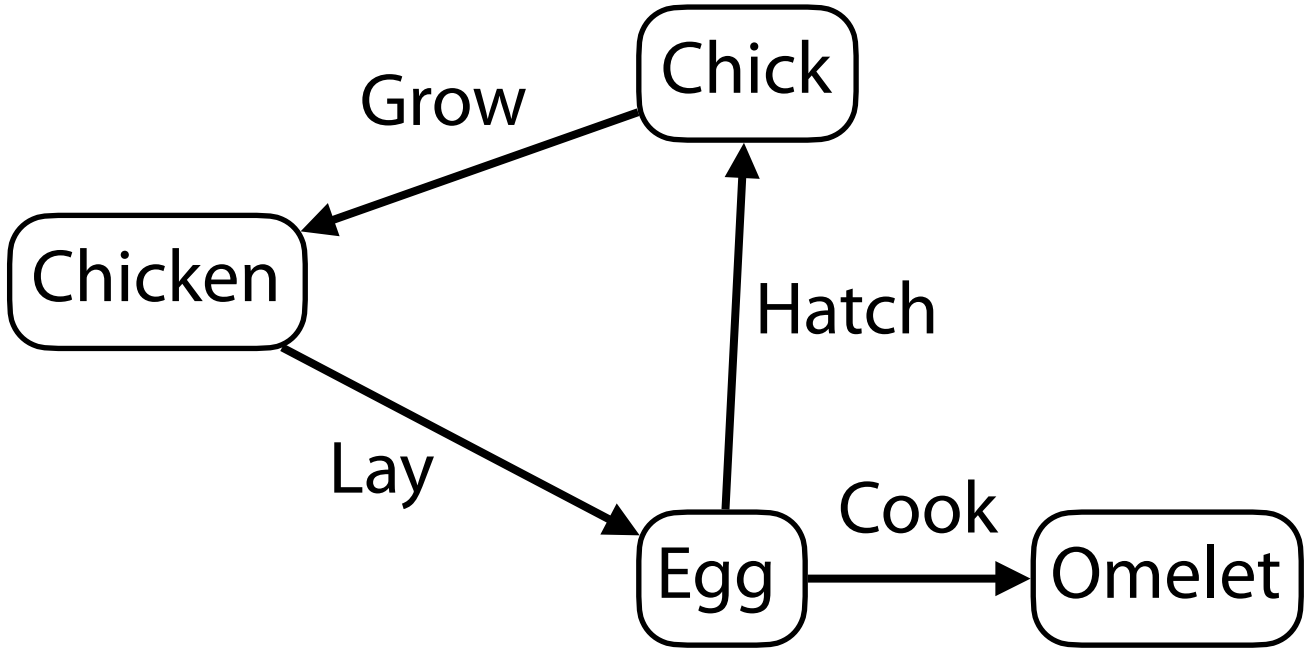
Practice State Diagrams

Phone lattices

Conway's Game of Life

State Diagrams

State Diagrams are directed graphs where vertices are states and edges are drawn between states when an action leads from one to the other



State Diagrams: Probabilities

What is the chance of rolling two ones in one roll of two six-sided dice?

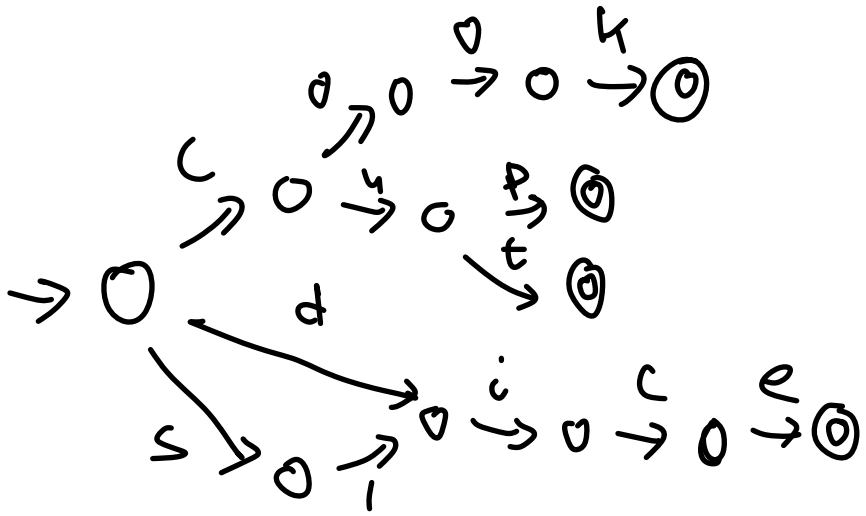
If you are allowed to re-roll, what is the probability of getting it?

State Diagrams: Phone lattices

S: cook, cup, cut, dice, slice

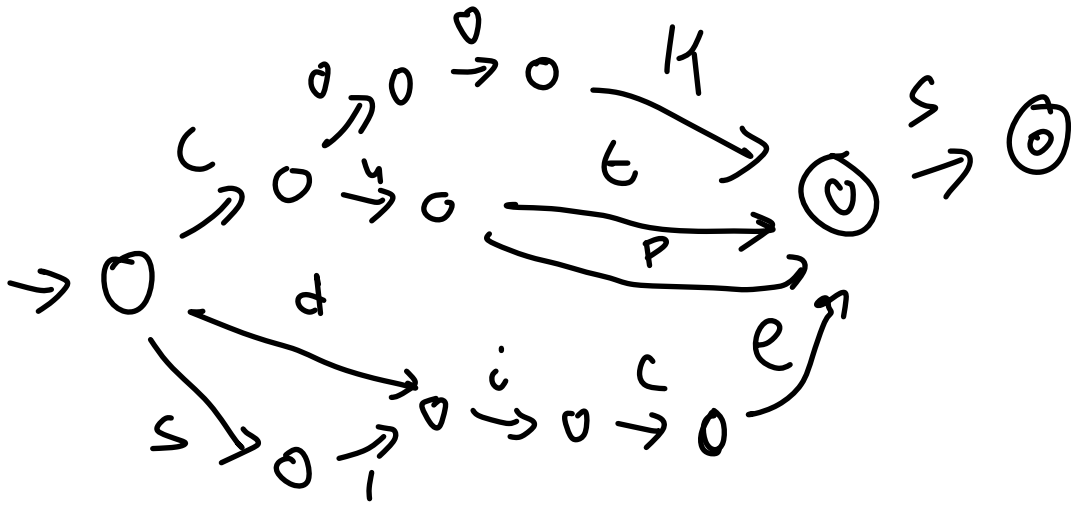
State Diagrams: Phone lattices

S: cook, cup, cut, dice, slice, cooks, cups, cuts, dices, slices



State Diagrams: Phone lattices

S: cook, cup, cut, dice, slice, cooks, cups, cuts, dices, slices, sixes



State Diagrams: Phone lattices

S: uh, uuh, uuuh, uuuuh, uuuuuh, …

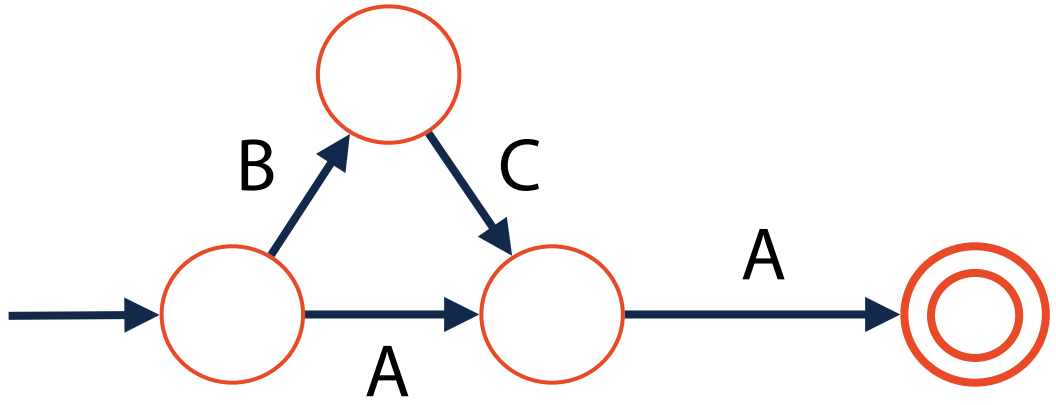
State Diagrams: Phone lattices

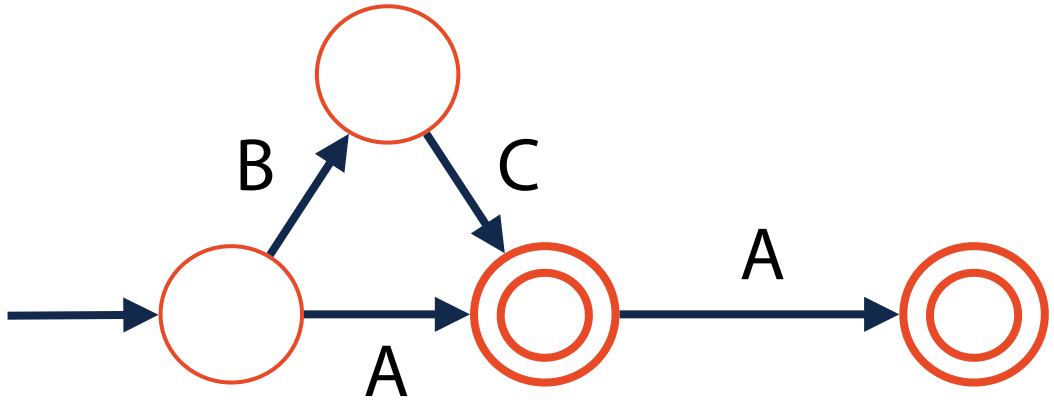
S: knight, kitten, knife, night

State Diagrams

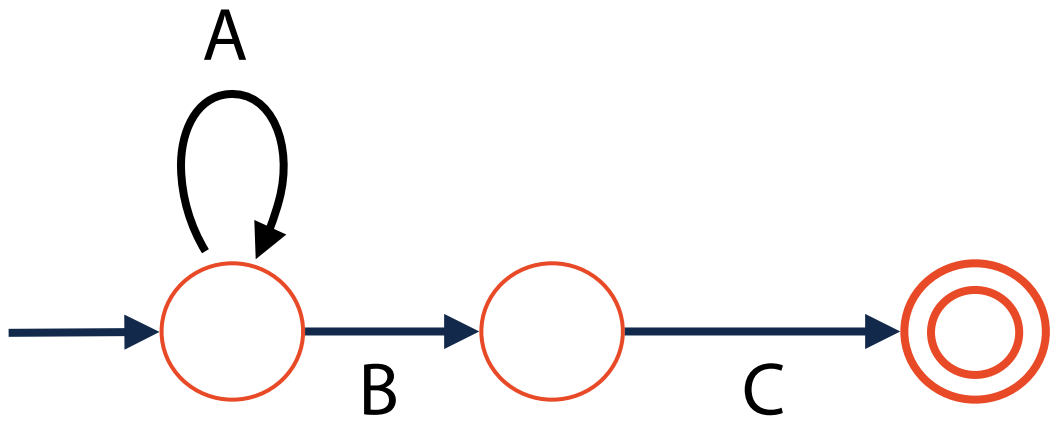
T: 1011 1101 1111 0111

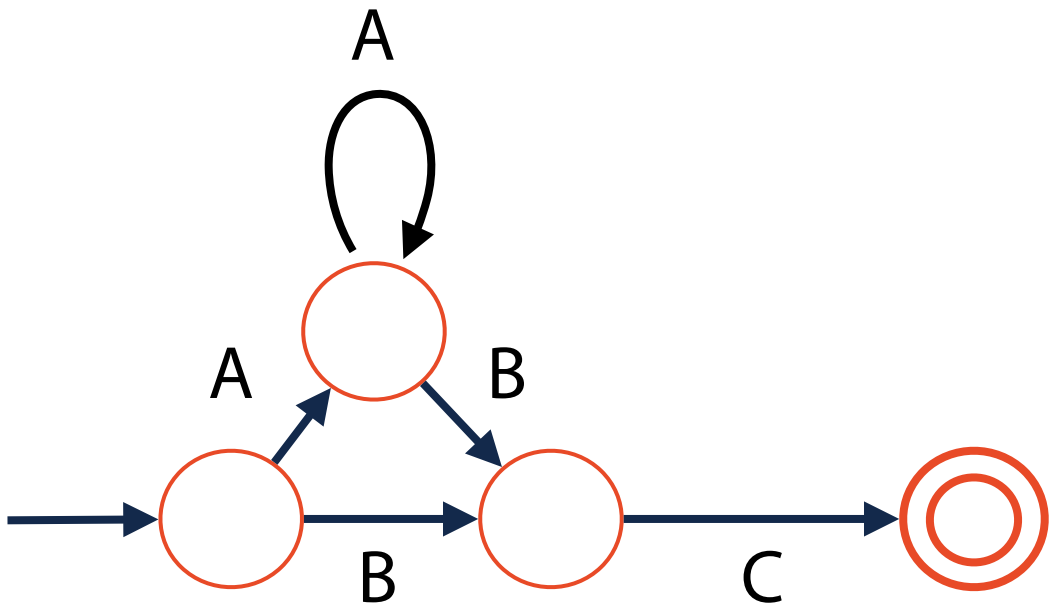
State Diagrams





State Diagrams





State Diagrams

A thief has broken into a jewelry store containing rings and necklaces but the jewelry is owned by a clever witch! After putting three necklaces or four rings into his bag, the thief will be teleported to jail with no way of escape. Model this situation as a state diagram.

State Diagrams

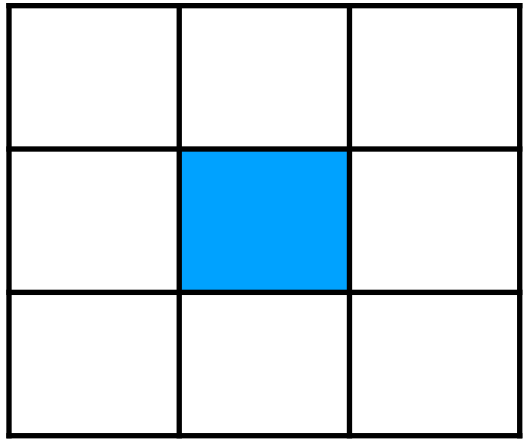
Brad has password protected the examlet answers using a machine that takes three numbers as input (0, 1, 2). If you input the correct password (221), you will get the answers but any other three number input will raise an alarm and lock you out of the machine.

State Diagrams with large or infinite states

Chess

Go

Conway's Game of Life



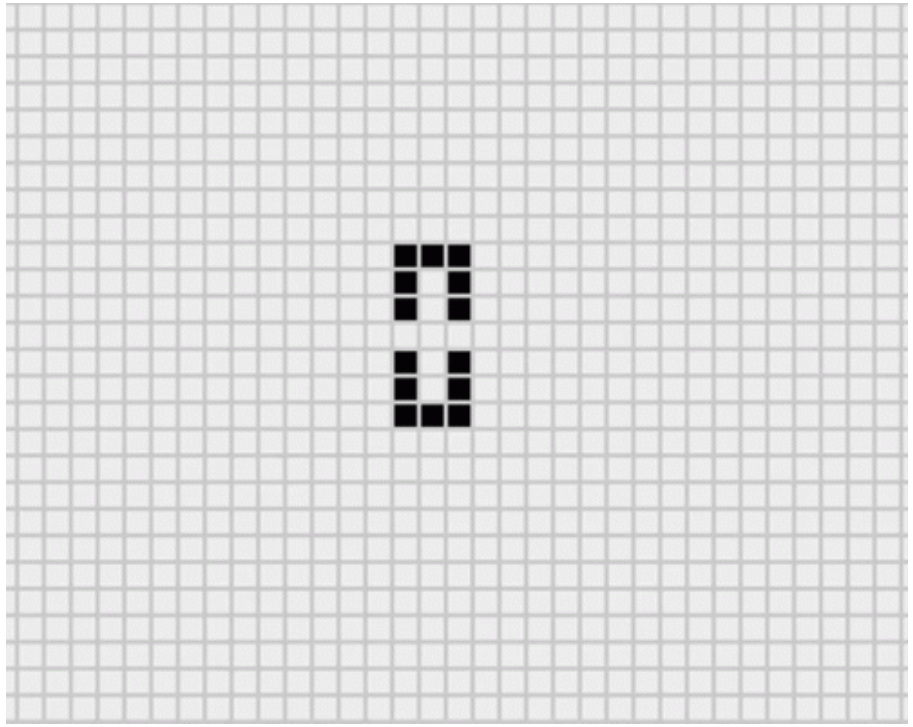
A 2D grid of cells where each cell has 8 neighbors

Cells are 'alive' or 'dead' with rules for state changes:

Live cells stay live if it has two or three neighbors (else dies)

Dead cells with exactly three live neighbors becomes live

State Diagrams with (potentially) infinite states



https://playgameoflife.com/