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CMSC 203 - Homework Assignment 4 - Due May 11, 2011

1. Consider the Sample Space of outcomes when a fair coin is tossed 6 times with an each outcome either a Head (H) or a Tail (T).

(a) What is the probability of the event of 4 Heads?

(b) What is the probability of the event of 4 Heads given the first toss is a Tail?

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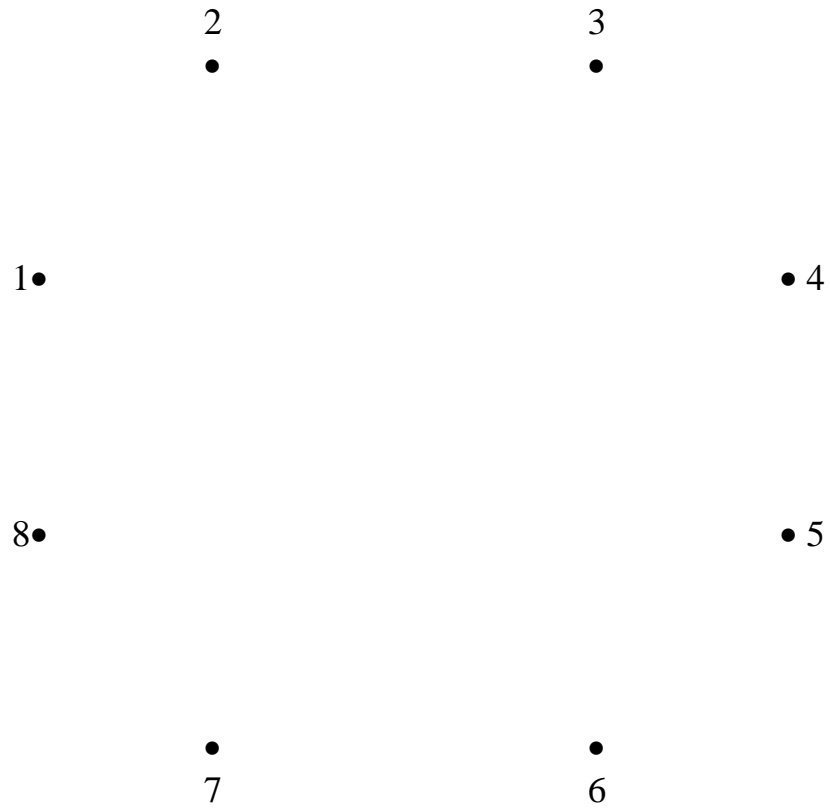
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2. In relation to question 1, determine whether or not the probability of tossing 4 Heads is independent of the first toss being a Tail.

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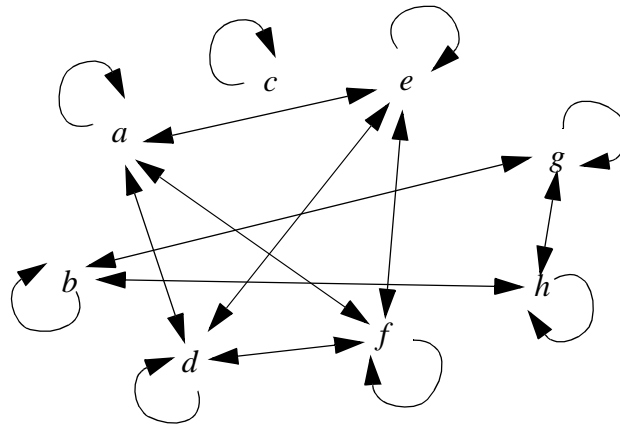
3. Draw the directed graph of the relation R on $A = \{1, 2, 3, 4, 5, 6, 7, 8\}$ defined as $R = \{(a,b) \mid a,b \in A \text{ and } (a + 2) \equiv b \pmod{5}\}$.



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4. Consider the relation, R , on the set $A = \{a, b, c, d, e, f, g, h\}$ given by the graph:



(a) Find $[e]$

(b) Find the partition of A induced by R

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5. Let F be a function on the integers given by $F(n) = (n - 5)^2$.

(a) Show that the relation $R = \{(x,y) \mid x,y \text{ are integers and } F(x) = F(y)\}$ is a Reflexive, Symmetric, and Transitive relation.

(b) Describe the partition of the integers induced by R .

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6. Consider the database consisting of the following Fields and Records:

First Name	Last Name	Age	Phone	Height (in.)	Weight
Alan	Jones	26	555-1234	68	155
Mary	Smith	32	555-4321	65	128
Ted	Green	32	555-6789	74	210
Susan	Green	30	555-6789	69	144
William	Peters	26	555-9876	73	195
Peter	Williams	44	555-2468	69	185

(a) For this database, which Fields would serve as Primary Keys?

(b) Find $P_{2,4}$