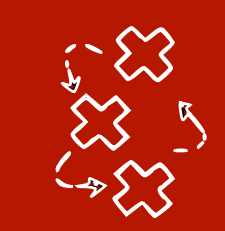


Causal Data Science

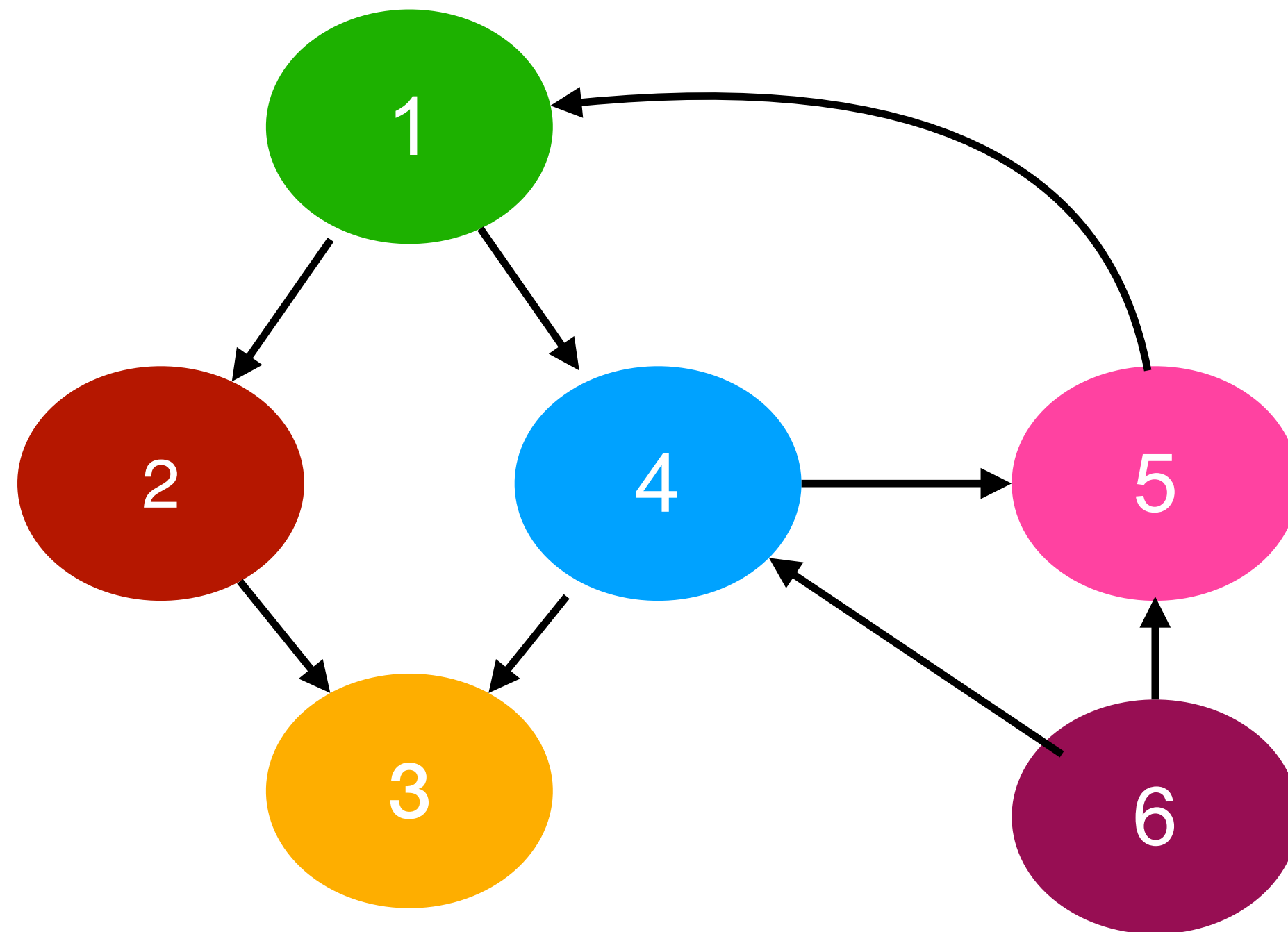
Lecture 4:0 Solutions to last lecture quizzes

Lecturer: Sara Magliacane

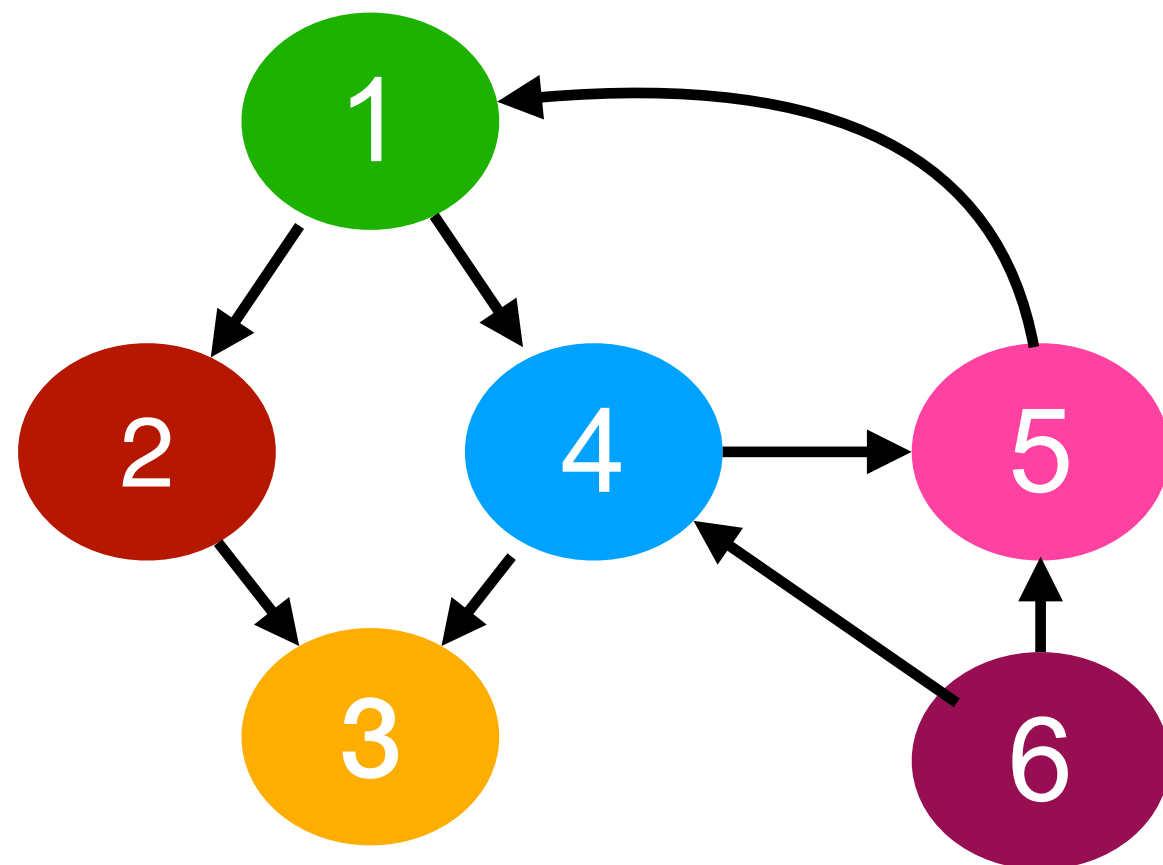
UvA - Spring 2023



Exercise in Canvas: graph terminology



Exercise in Canvas: graph terminology



1 Multiple choice 0.5 points

What is the sequence of nodes (2,4,6)?

- ☐ A directed path
- ☐ A path, but not directed
- ☒ Not a path

2 Multiple choice 0.5 points

What is the sequence of nodes (6,5,1)?

- ☐ Not a path
- ☒ A directed path
- ☐ A path but not directed

3 Multiple choice 0.5 points

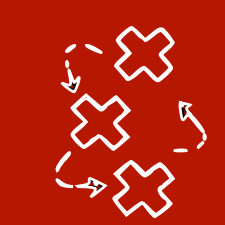
What is the sequence of nodes (2,3,4,3)?

- ☒ Not a path
- ☐ A directed path
- ☐ A path, but not directed

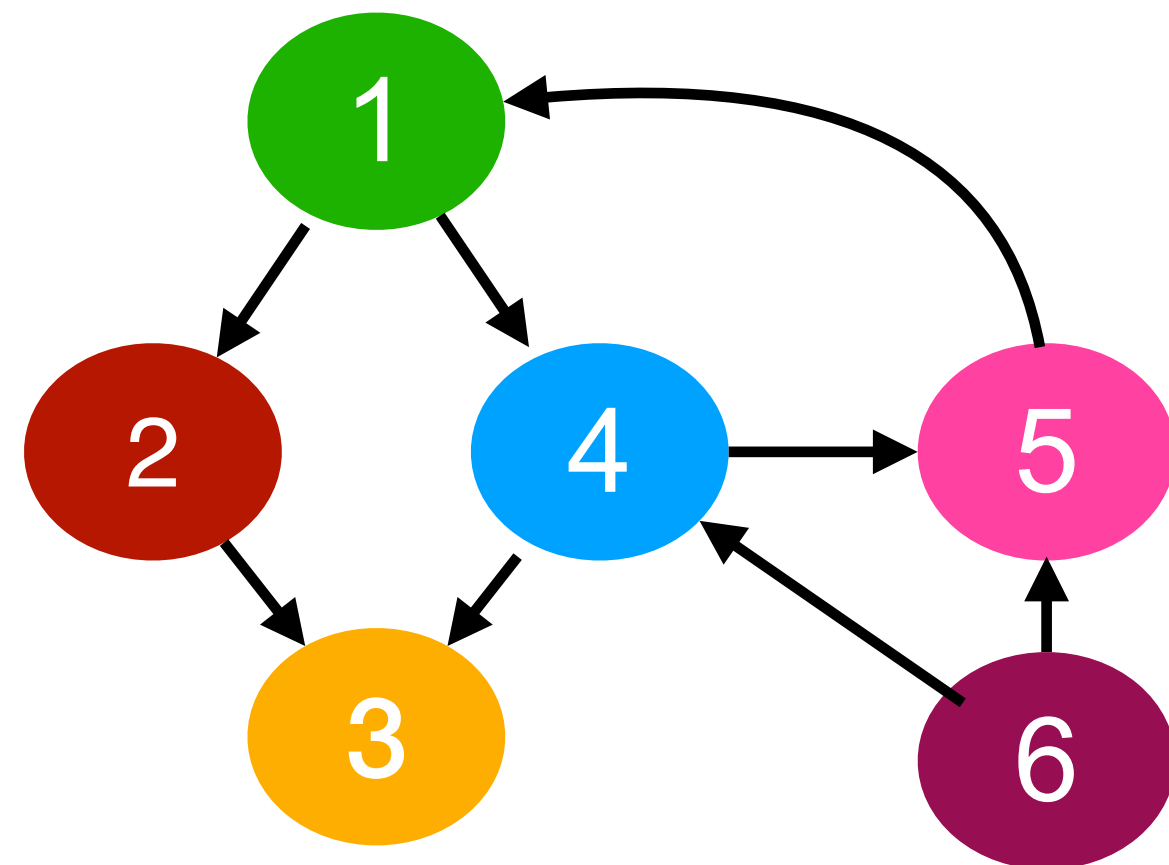
4 Multiple choice 0.5 points

What is the sequence of node (1,4,6,5)?

- ☒ A path, but not directed
- ☐ A directed path
- ☐ Not a path



Exercise in Canvas: graph terminology



5

Matching 2 points



Match each sequence of edges with each type of cycle

1,4,3,1

Not a cycle (not a path)



1,4,5,1

Directed cycle



1,4,3,2,1

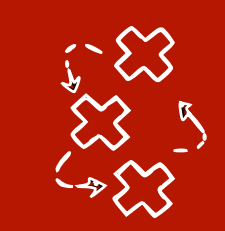
A cycle , but not a directed cycle



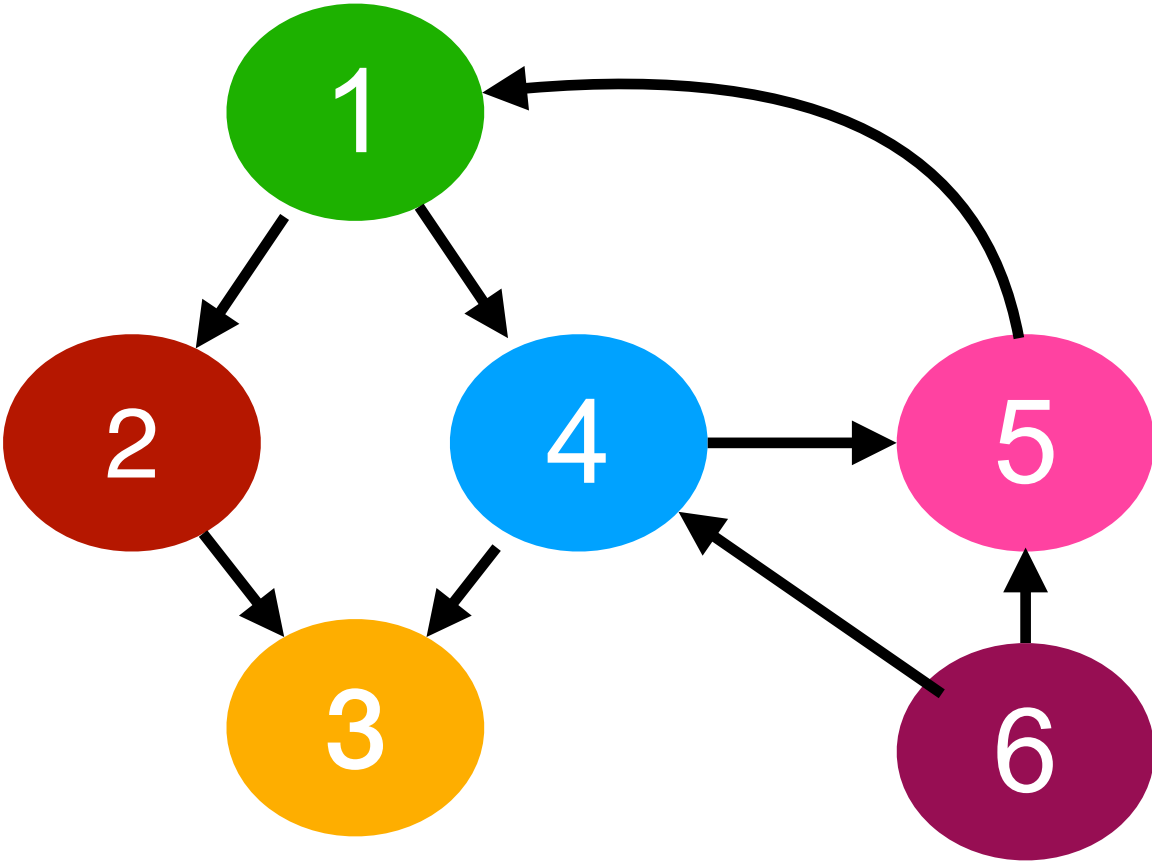
6,5,4

A path, but not a cycle





Exercise in Canvas: graph terminology



6 Multiple answer 0.5 points

Which nodes are the parents of node 4? (select all that apply)

- ☒ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☒ 6

7 Multiple answer 0.5 points

Which nodes are the children of node 6? (select all that apply)

- ☐ 1
- ☐ 2
- ☐ 3
- ☒ 4
- ☒ 5
- ☐ 6

8 Multiple answer 0.5 points

Which nodes are the descendants of node 6? (select all that apply)

- ☒ 1
- ☒ 2
- ☒ 3
- ☒ 4
- ☒ 5
- ☒ 6

9 Multiple answer 0.5 points

Which nodes are the ancestors of node 2? (select all that apply)

- ☒ 1
- ☒ 2
- ☐ 3
- ☒ 4
- ☒ 5
- ☒ 6

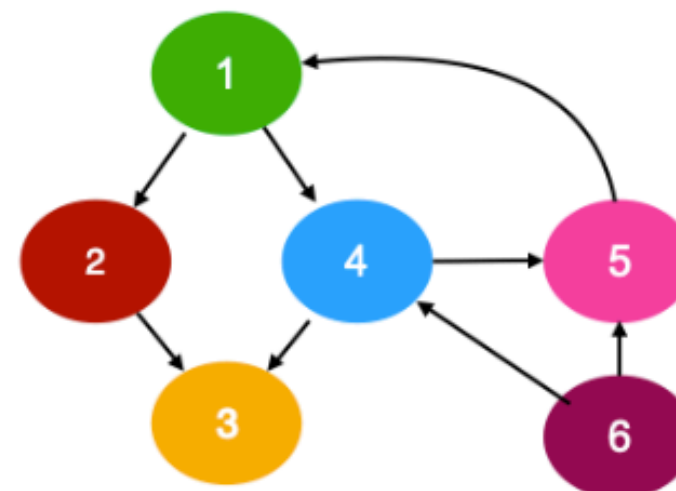
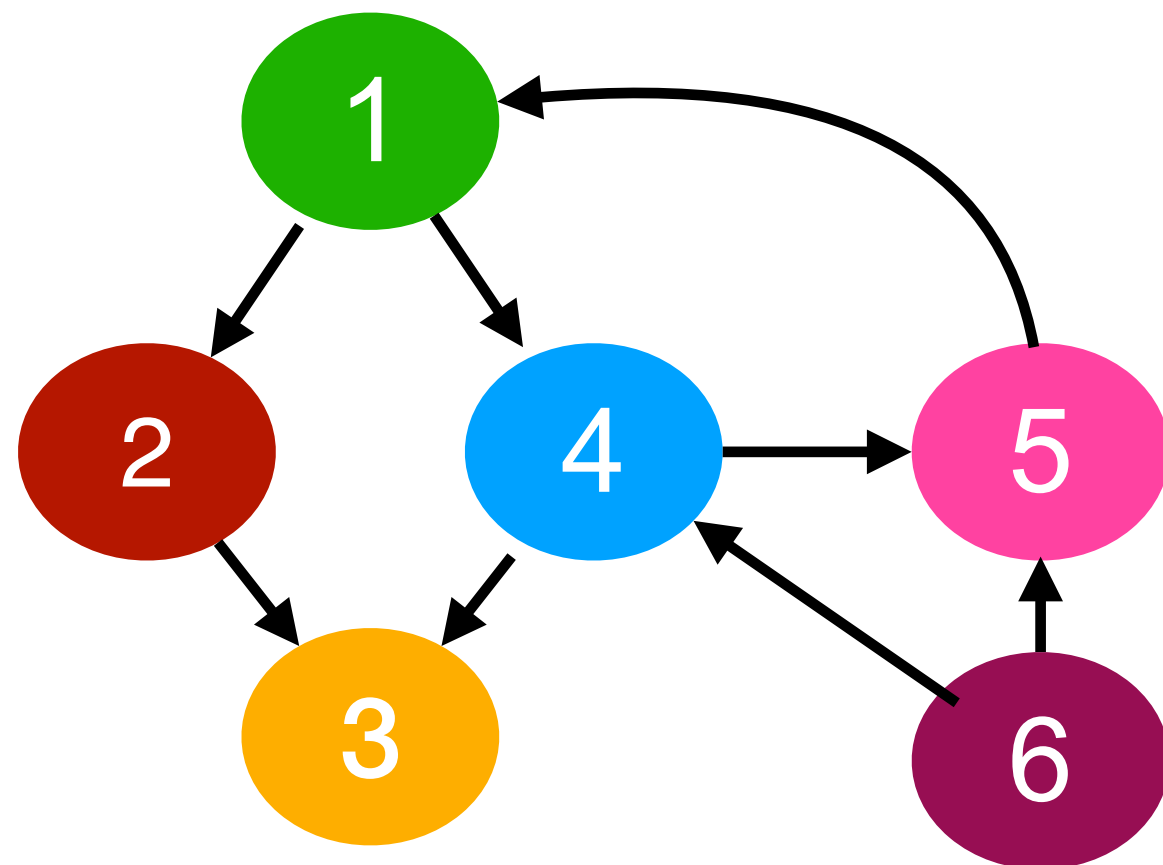
Exercise in Canvas: graph terminology

10

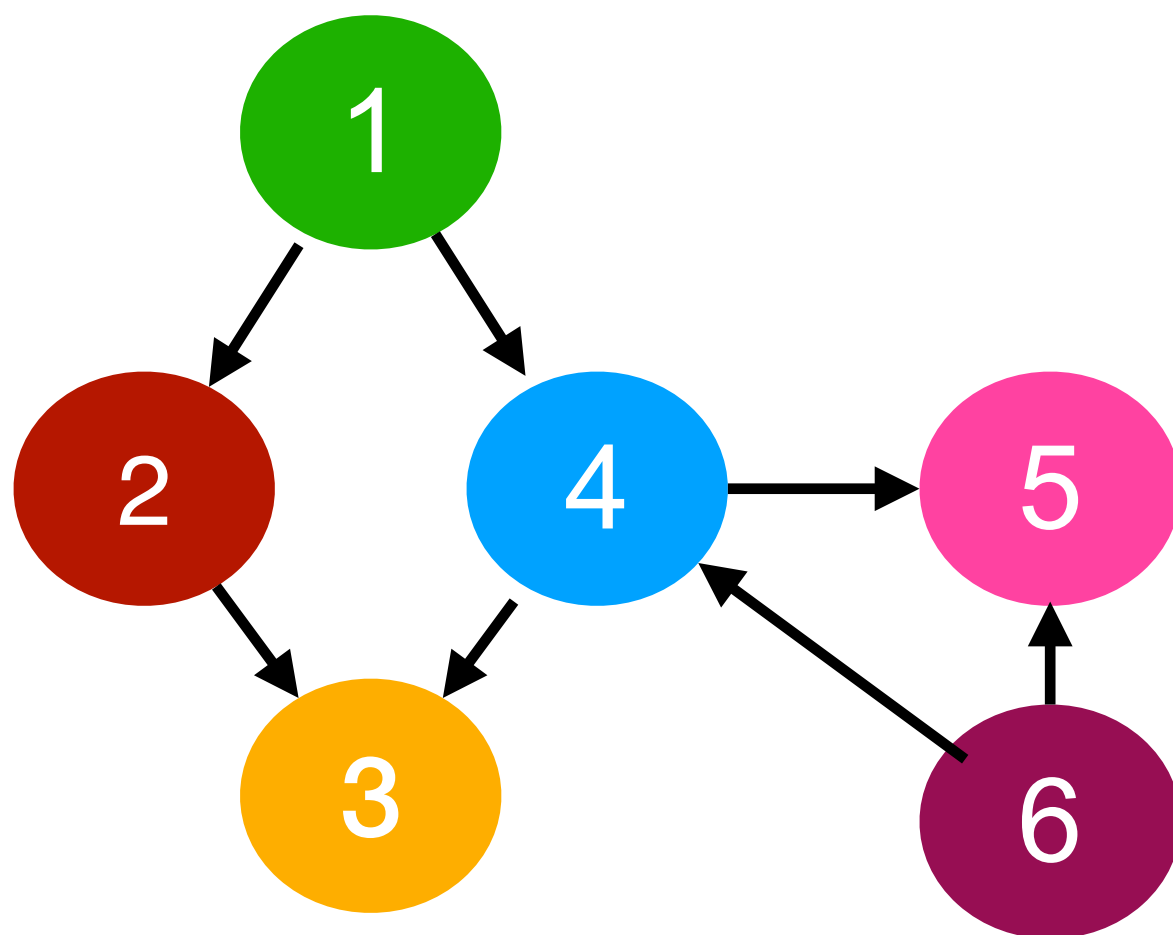
Multiple choice 1 point

Which nodes are the descendants of nodes 3 and 4? (select all that apply)
HINT: in our definition nodes are their own descendants

- ☒ 1,2,3,4,5
- ☐ 3,4
- ☐ 1,2,3,4,5,6
- ☐ 3,4,5



Exercise 2 in Canvas: d-separation



1 Multiple choice 0.5 points Colliders

If 4 a collider in the graph?

- ☒ Trick question
- ☐ Yes
- ☐ No

2 Multiple choice 0.5 points Colliders on a path

Is 4 a collider on the path 1, 4, 6, 5? What about on path 3, 4, 5?

- ☐ It's a collider on both
- ☐ It's not a collider on neither
- ☒ Only on path 1,4,6,5
- ☐ Only on path 3,4,5

3 True or False 0.5 points Blocked paths

Path 1,4,5 between 1 and 5 is blocked by $A = \{4\}$

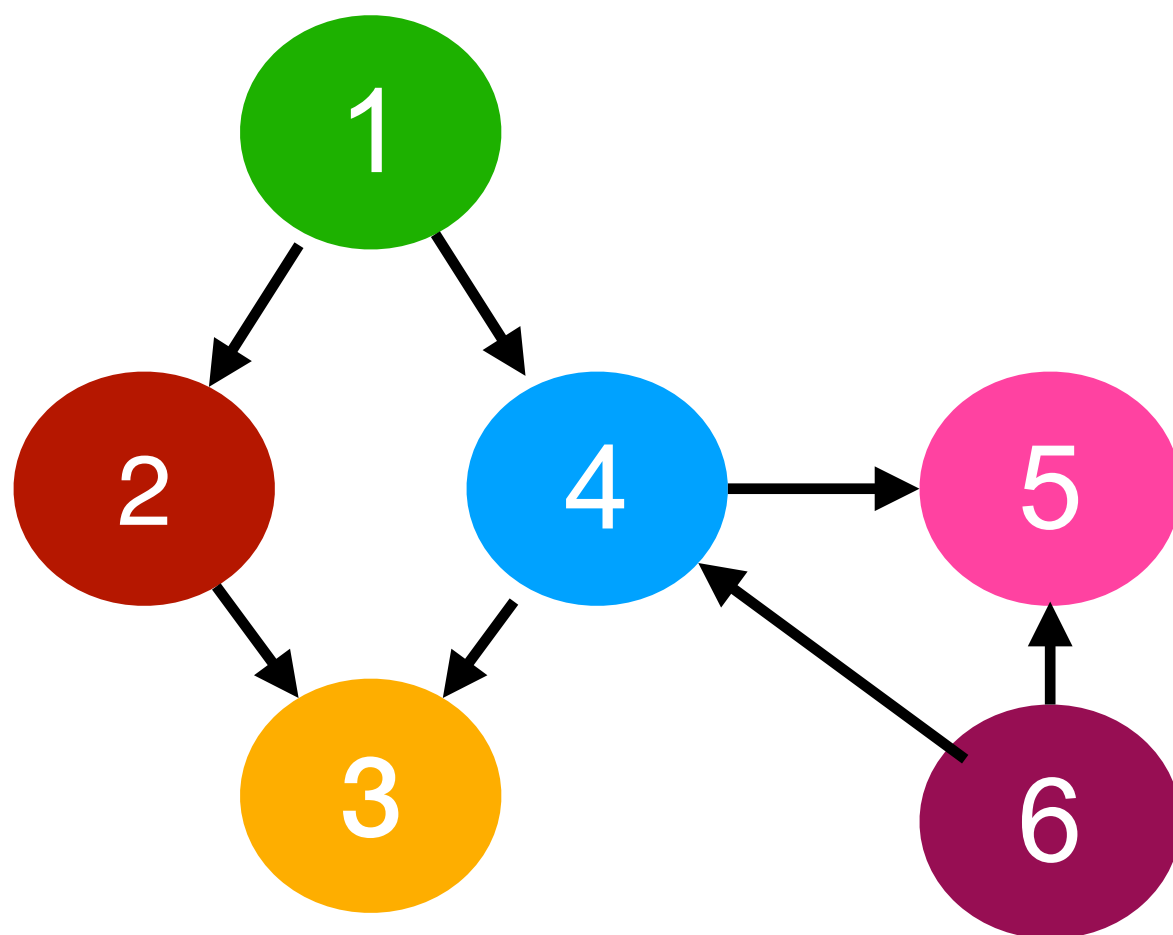
- ☒ True
- ☐ False

4 True or False 0.5 points Blocked paths

Path 1,4,6 between 1 and 6 is blocked by $A = \{4\}$

- ☐ True
- ☒ False

Exercise 2 in Canvas: d-separation



5 True or False 0.5 points Blocked paths

Path 1,4,6 between 1 and 6 is blocked by $A=\{5\}$

- ☐ True
- ☒ False

6 Multiple choice 0.5 points D-separation

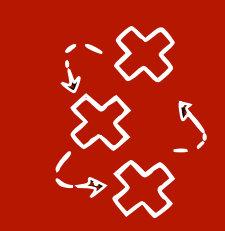
1 is d-separated from 6 when we consider $A...$

- ☒ $A = \{\}$ (empty set)
- ☐ $A = \{4\}$
- ☐ $A = \{5\}$
- ☐ $A = \{2,3\}$

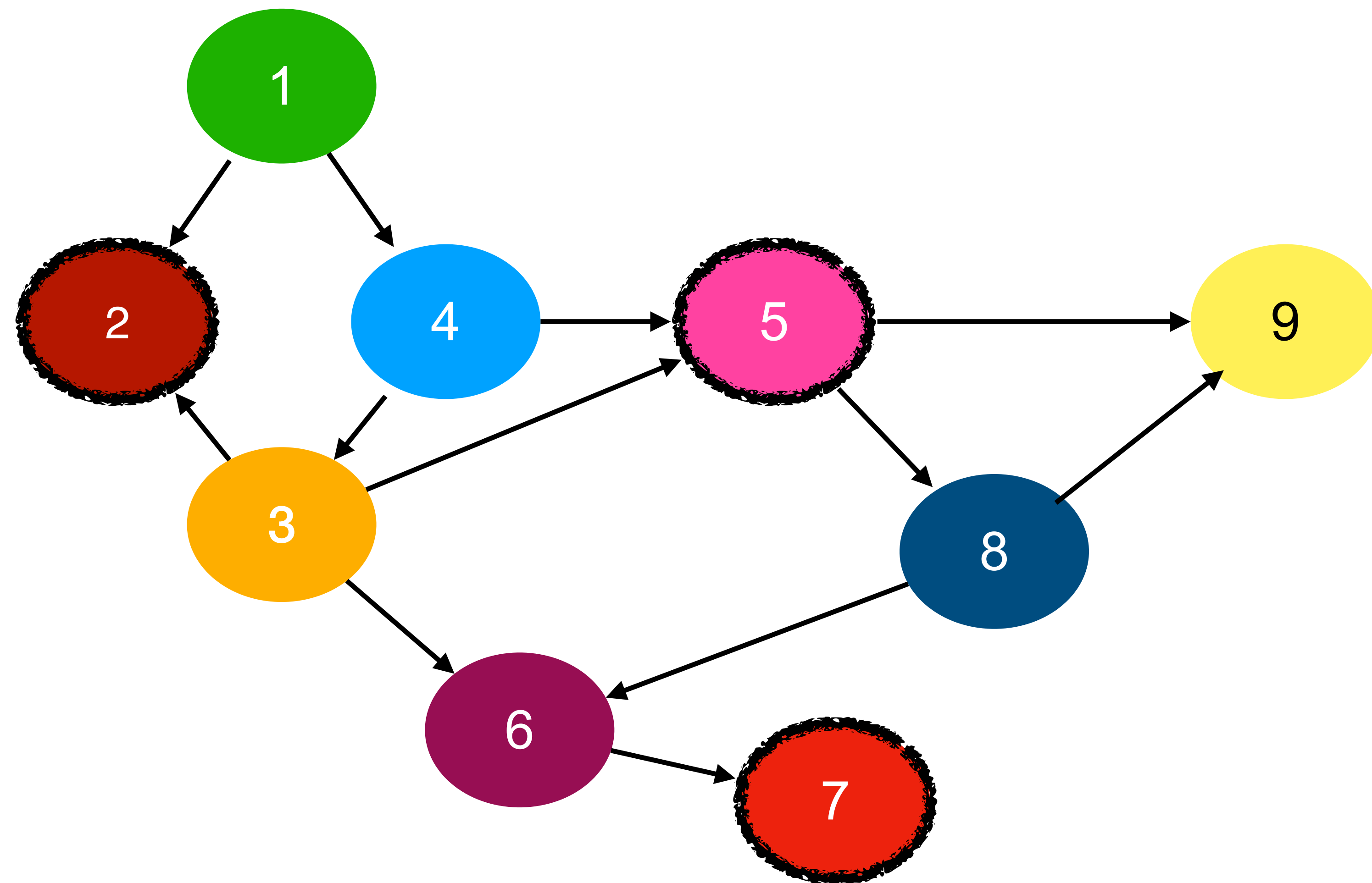
7 Multiple choice 1 point

1 is d-separated from 3 when we consider $A...$

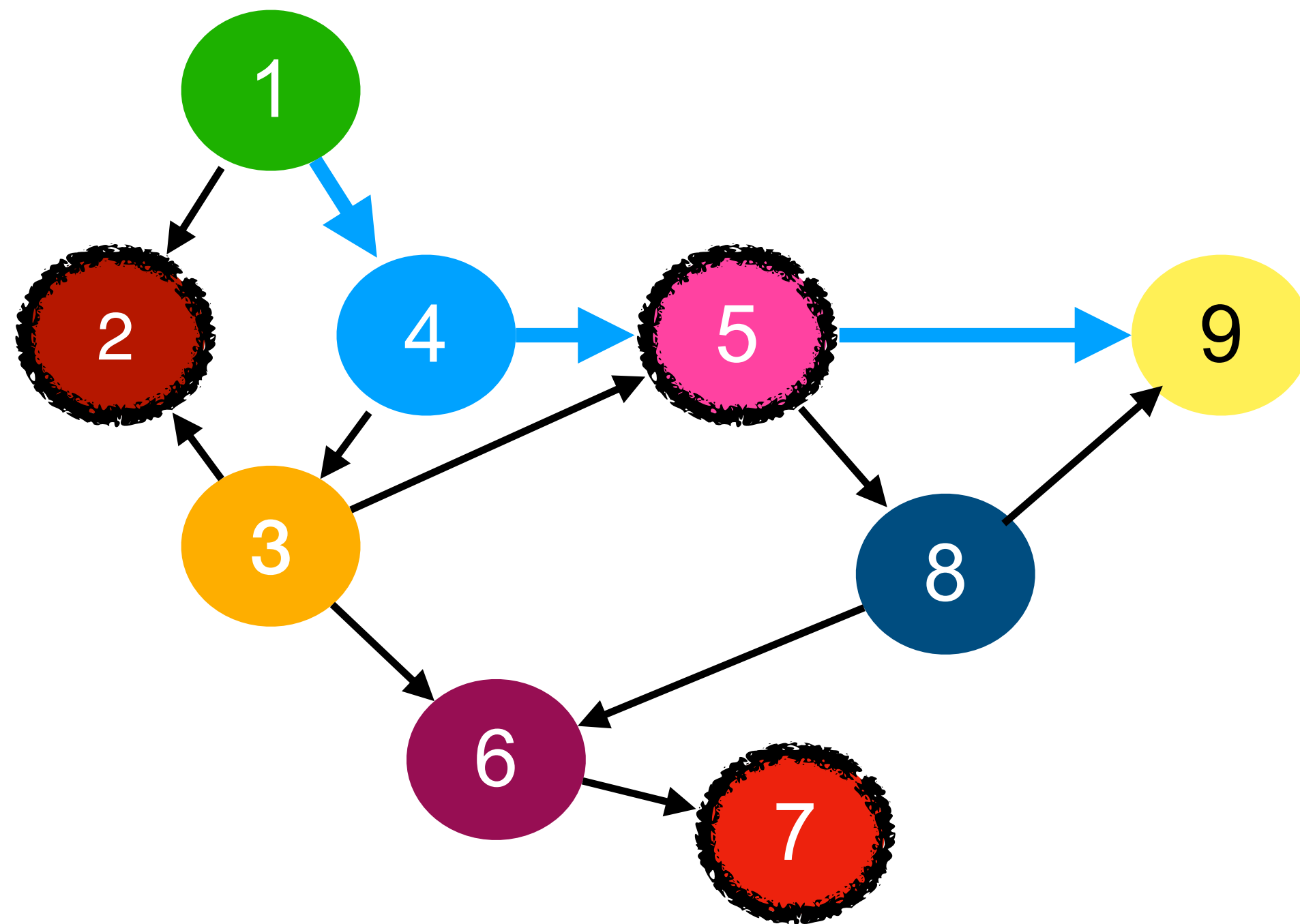
- ☐ $A=\{2\}$
- ☐ $A=\{4\}$
- ☒ $A=\{2,4\}$
- ☐ $A=\{\}$



Optional exercise in Canvas: d-separation 2



Optional exercise in Canvas: d-separation 2



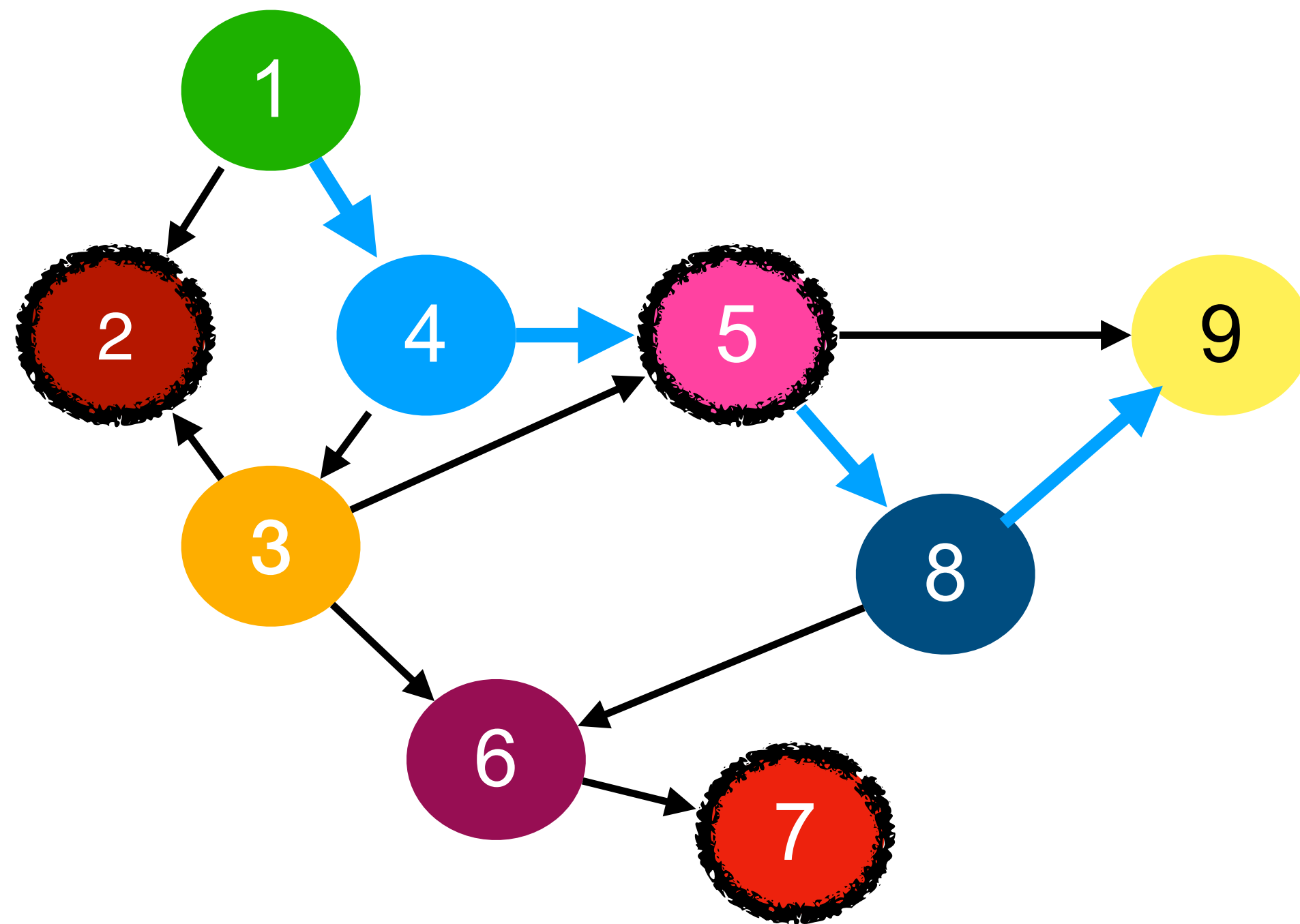
1 True or False 0 points

Is the path from 1 to 9 through 1,4,5,9 blocked when $A = \{2,5,7\}$?

☒ True

☐ False

Optional exercise in Canvas: d-separation 2



1 True or False 0 points

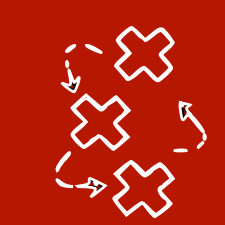
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☐ False

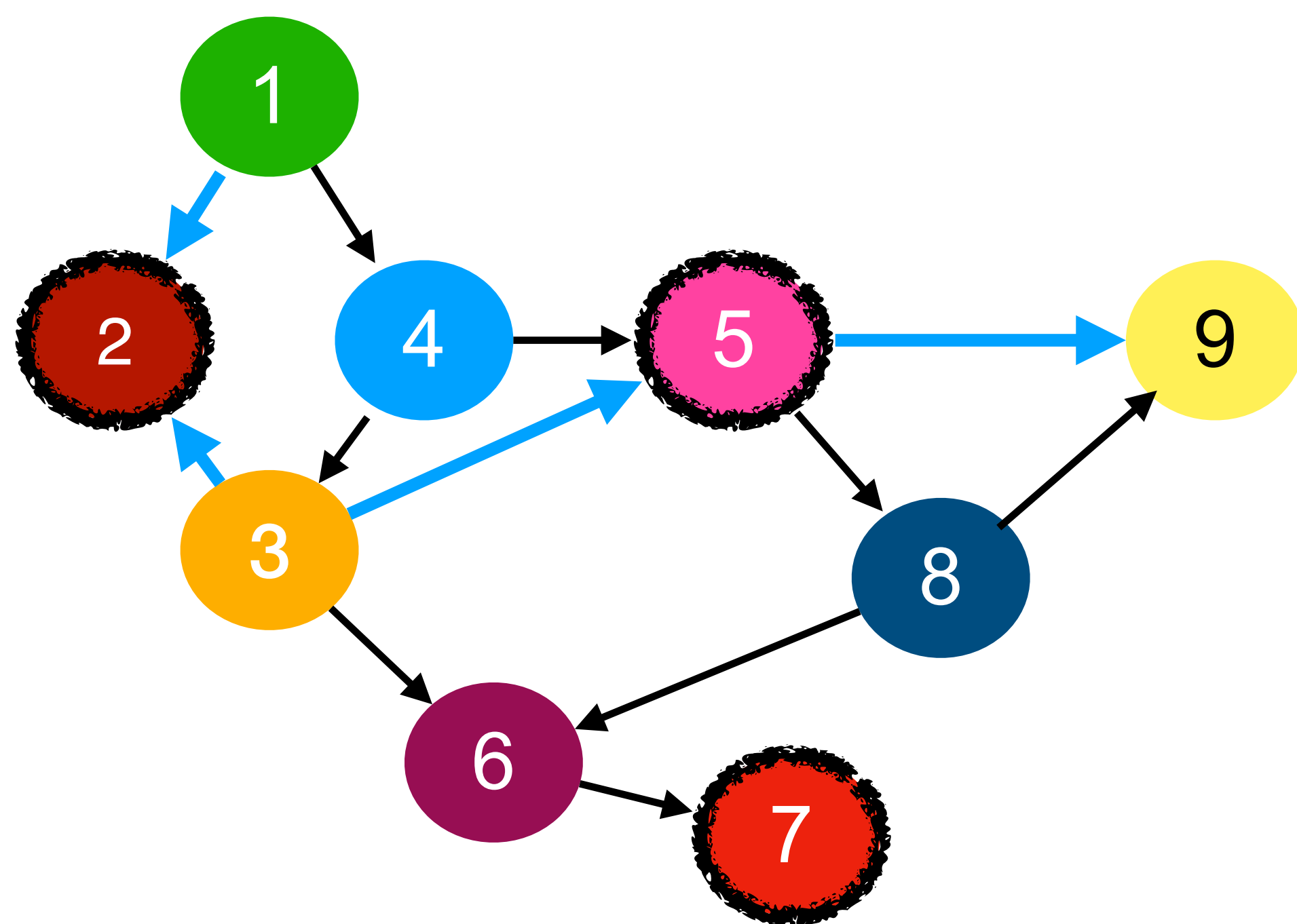
2 True or False 0 points

Is the path from 1 to 9 through 1,4,5,8,9 blocked when $A = \{2,5,7\}$?

- ☒ True
☐ False



Optional exercise in Canvas: d-separation 2



1 True or False 0 points

Is the path from 1 to 9 through 1,4,5,9 blocked when $A = \{2,5,7\}$?

- ☒ True
☐ False

2 True or False 0 points

Is the path from 1 to 9 through 1,4,5,8,9 blocked when $A = \{2,5,7\}$?

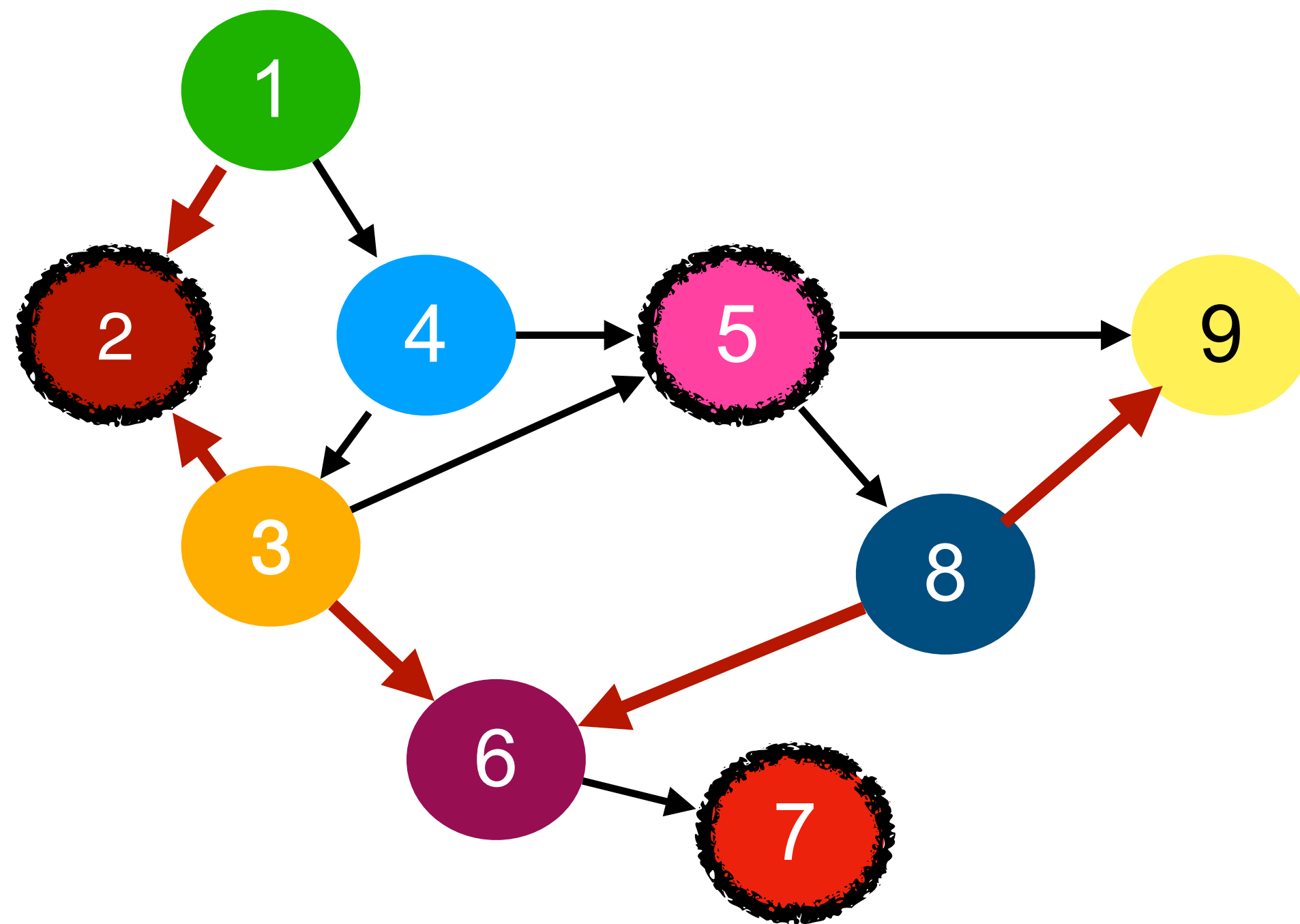
- ☒ True
☐ False

3 True or False 0 points

Is the path from 1 to 9 through 1, 2, 3, 5, 9 blocked when $A = \{2,5,7\}$?

- ☒ True
☐ False

Optional exercise in Canvas: d-separation 2



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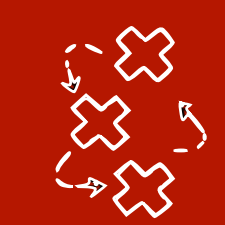
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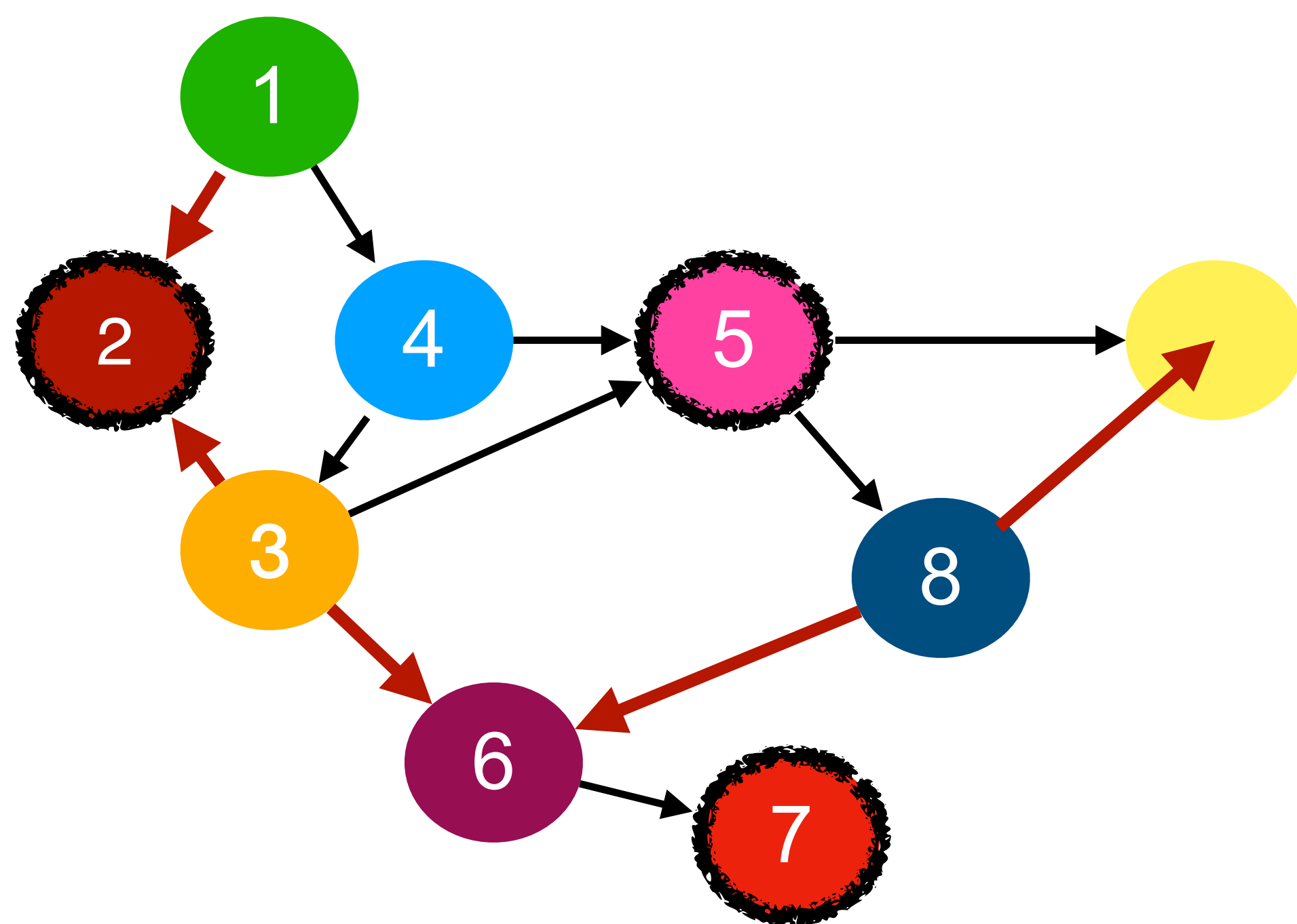
4 True or False 0 points

Is the path from 1 to 9 through 1,2,3,6,8,9 blocked when $A = \{2,5,7\}$?

- ☐ True
☒ False



Optional exercise in Canvas: d-separation 2



1 True or False 0 points

Is the path from 1 to 9 through 1,4,5,9 blocked when $A = \{2,5,7\}$?

- ☒ True
☐ False



2 True or False 0 points

Is the path from 1 to 9 through 1,4,5,8,9 blocked when $A = \{2,5,7\}$?

- ☒ True
☐ False



5 True or False 0 points

1 is d-separated from 9, when $A = \{2,5,7\}$?

- ☐ True
☒ False

3 True or False 0 points

Is the path from 1 to 9 through 1, 2, 3, 5, 9 blocked when $A = \{2,5,7\}$?

- ☒ True
☐ False



4 True or False 0 points

Is the path from 1 to 9 through 1,2,3,6,8,9 blocked when $A = \{2,5,7\}$?

- ☐ True
☒ False

