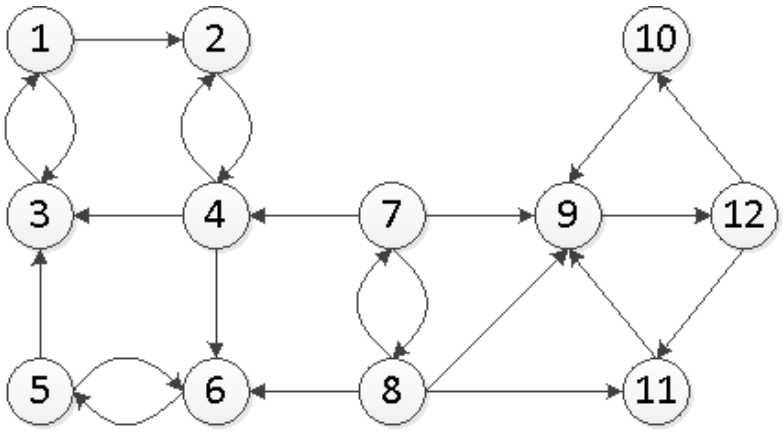
8. Exercise: Periodic states

None due May 29, 2020 05:29 IST

Exercise: Periodic states

4 points possible (ungraded)

Consider a Markov chain with the following transition probability graph:



1. How many recurrent classes are there?

Select an option **Answer:** 2

2. How many periodic recurrent classes are there?

Select an option **Answer:** 2

3. What is the smallest period among these?

Select an option **Answer:** 2

4. What is the largest period among these?

Select an option **Answer:** 3

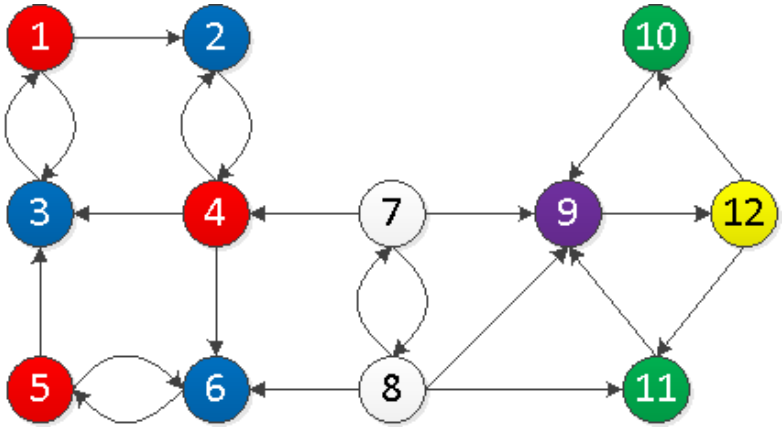
Solution:

1. There are two recurrent classes: $\{1, 2, 3, 4, 5, 6\}$ and $\{9, 10, 11, 12\}$.

2. Both of the recurrent classes are periodic.

3. The recurrent class $\{1, 2, 3, 4, 5, 6\}$ has a period of 2. In the figure below, the state within this recurrent class alternates between a red state and a blue state.

4. The recurrent class $\{9, 10, 11, 12\}$ has a period of 3. In the figure below, the state within this recurrent class cycles from a purple state, to a yellow state, to a green state, and back to a purple state.



Submit You have used 0 of 3 attempts

Answers are displayed within the problem

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Hint for finding period.

Identify those states that has only one out-going arc. It's highly possible that they live in one group and t...

Related to my question on the lecture ... how do we see periodicity without the colors present?

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For instance, once we get into the recurrent class on the right, we still won't end up on 10 every three "ju...