

Mini Models

EECS 4315

www.cse.yorku.ca/course/4315/

Many Choices

```
Random random = new Random();  
byte b = 0;  
while (random.nextBoolean())  
    b++;  
System.out.println(b);
```

Many Choices

Question

How many different executions does the app **ManyChoices** have?

Many Choices

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How many different executions does the app **ManyChoices** have?

Answer

Infinitely many.

Many Choices

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Question

How many different states does JPF encounter?

Many Choices

Question

How many different executions does the app **ManyChoices** have?

Answer

Infinitely many.

Question

How many different states does JPF encounter?

Answer

257

Many Choices

```
Random random = new Random();  
byte b = 0;  
while (random.nextBoolean())  
    b = (byte) ((b + 1) % 5);  
System.out.println(b);
```

Many Choices

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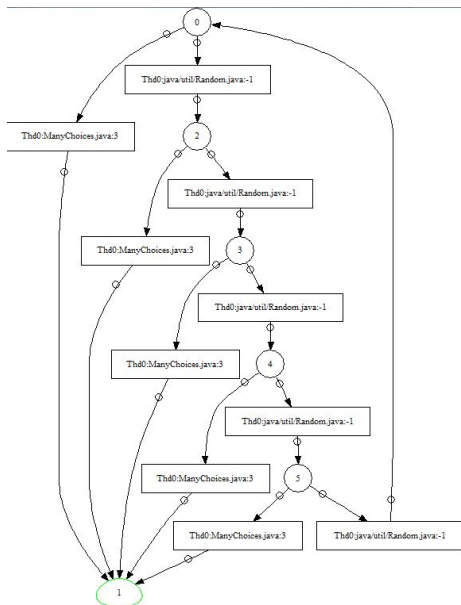
Question

How many different states does JPF encounter?

Answer

6

Two Choices



Question

How can there be infinitely many executions and only finitely many states?

Many Choices

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Answer

States occur infinitely many times in the executions. There are cycles.

Many Choices

Question

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Answer

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Comment

To detect cycles, one needs to remember which states have already been encountered. By combining multiple transitions into a single transition, there are fewer states to be remembered.

Labelled Transition System

A labelled transition system is similar to a directed graph.

state	vertex
transition	edge

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Question

Name two ways to traverse the vertices and edges of a directed graph.

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Question

Name two ways to traverse the vertices and edges of a directed graph.

Answer

Depth-first search (DFS) and breadth-first search (BFS).