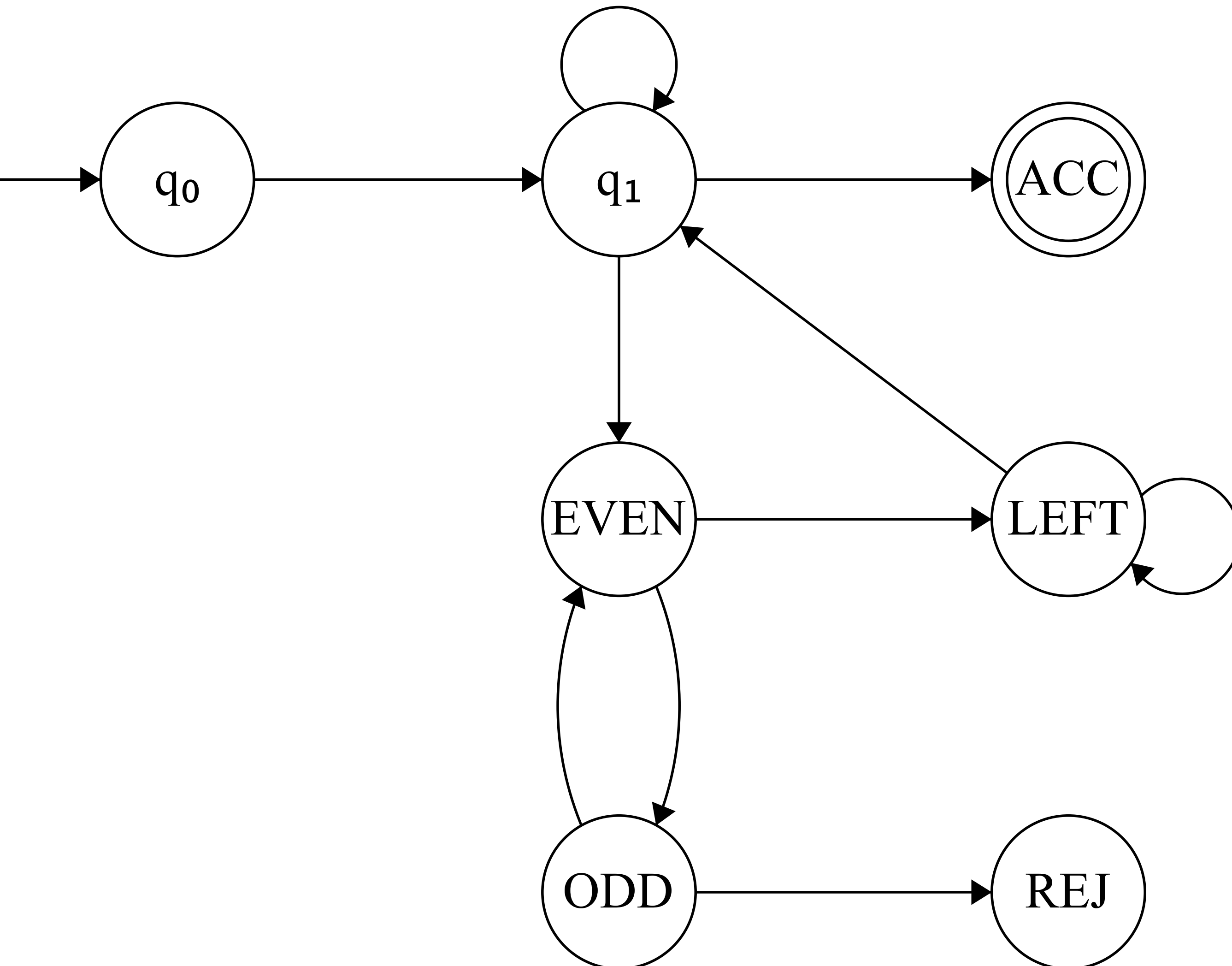


Turing Machine Examples

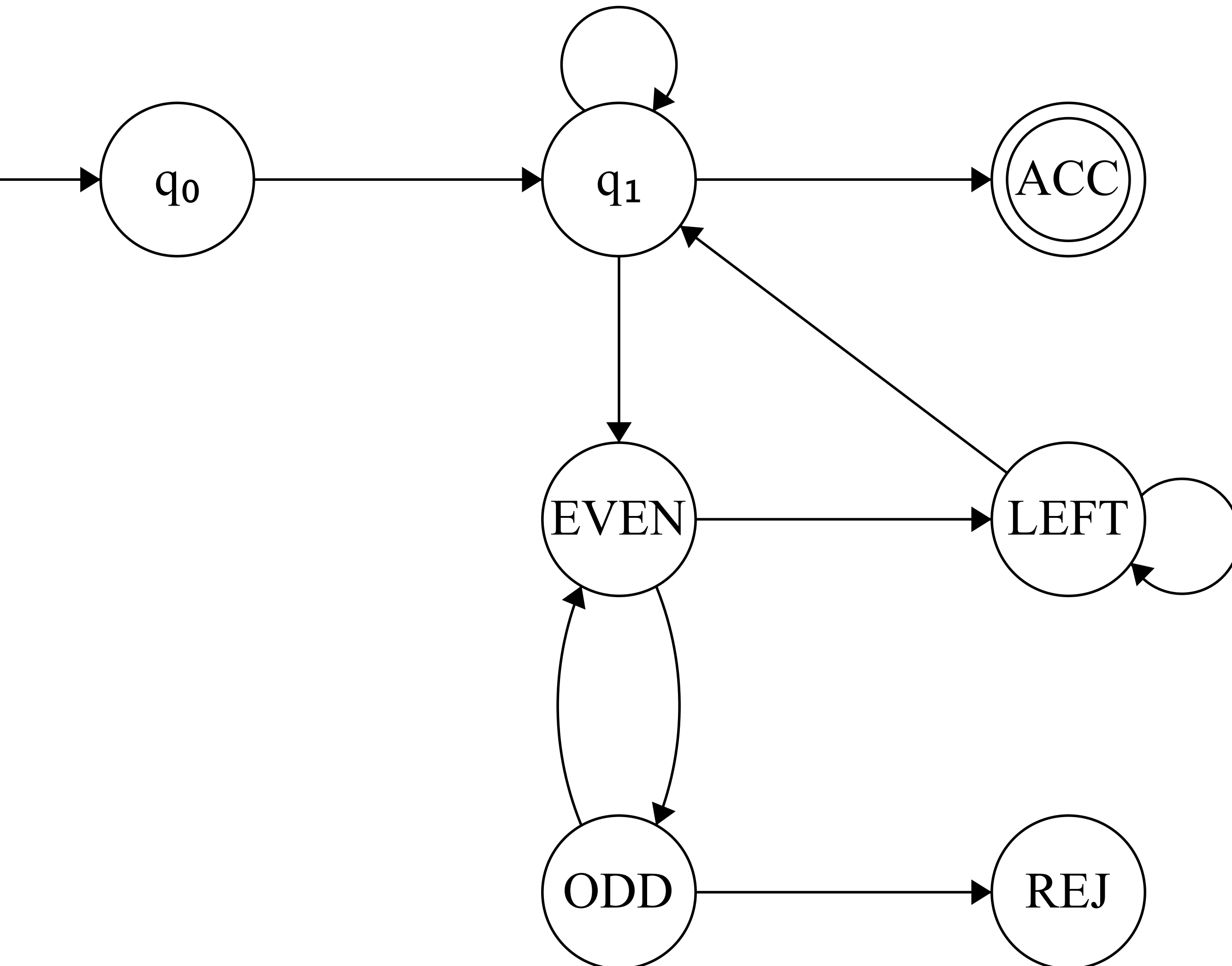
State Diagrams and Algorithms

Oliver Chubet, October 30, 2024

Deciding Powers of 2

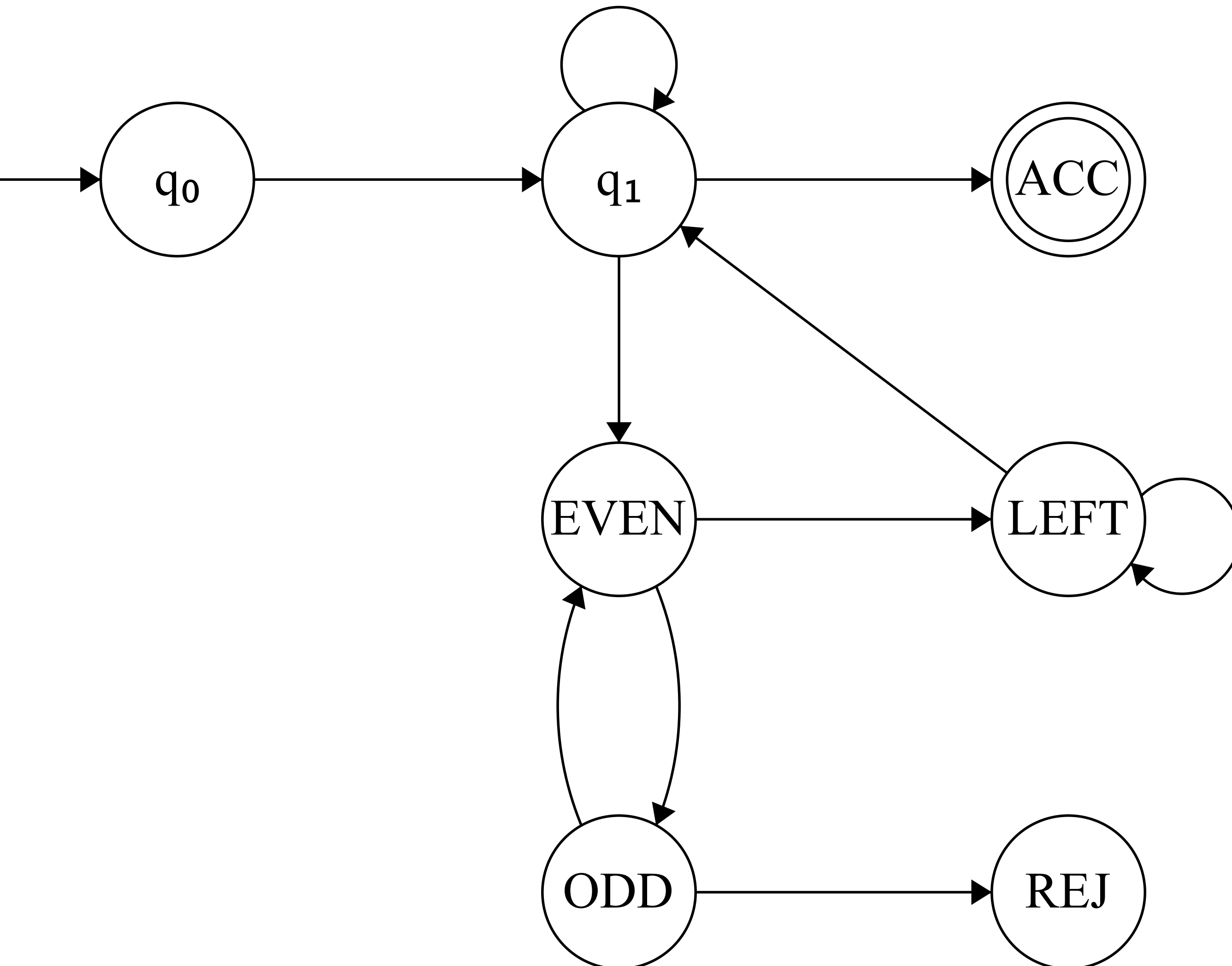


Deciding Powers of 2



On input a^m :

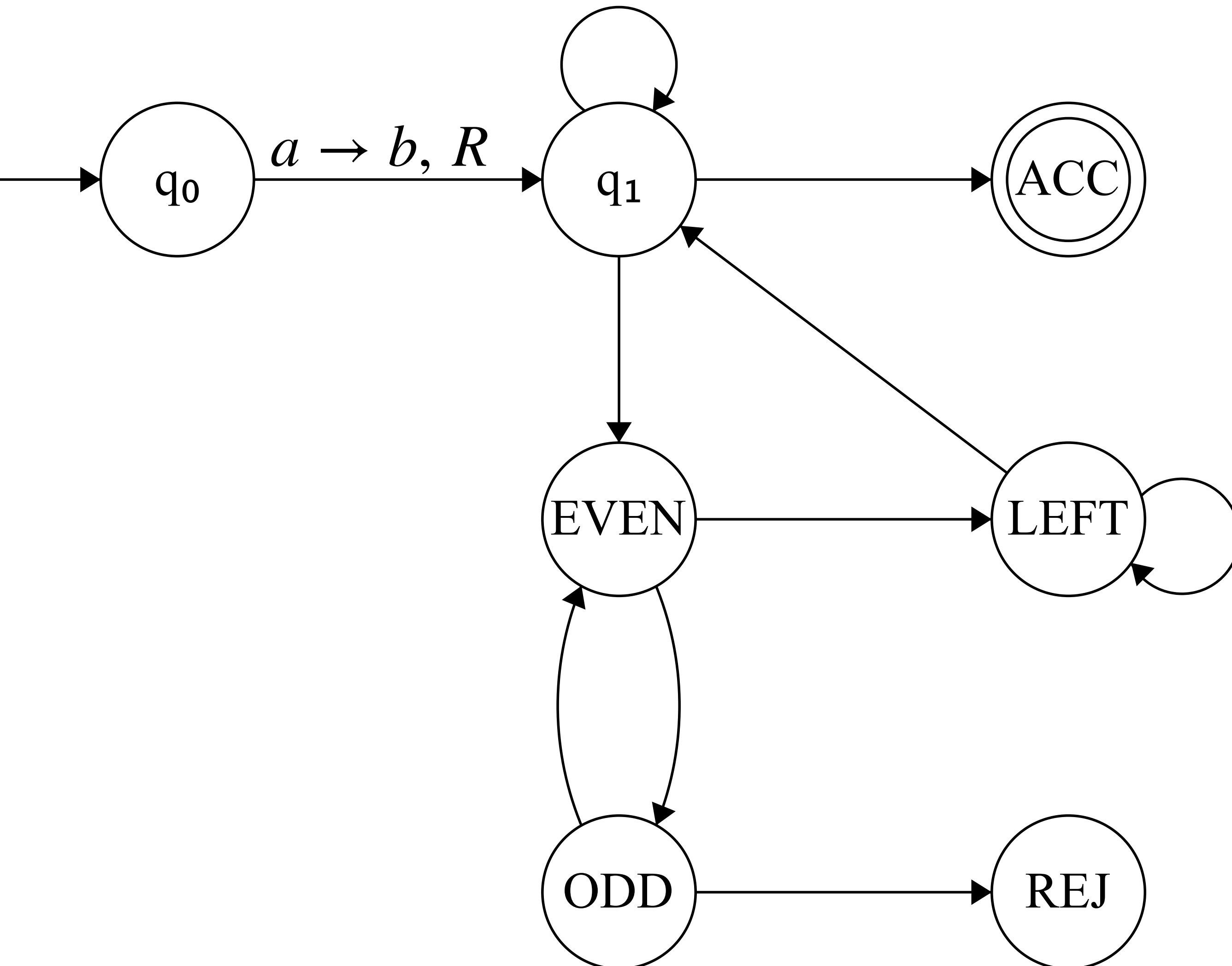
Deciding Powers of 2



On input a^m :

1. **Convert** the first a symbol to b .

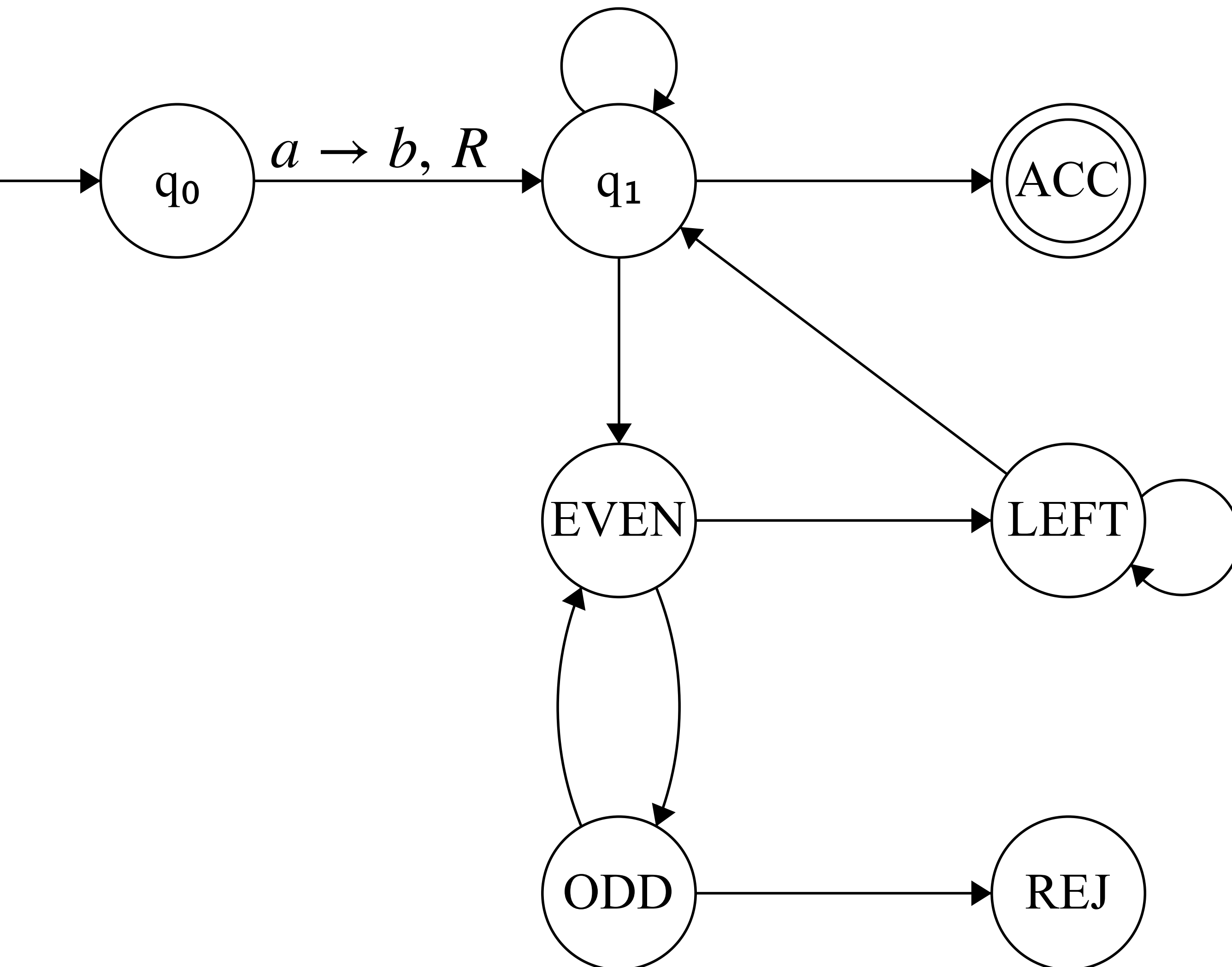
Deciding Powers of 2



On input a^m :

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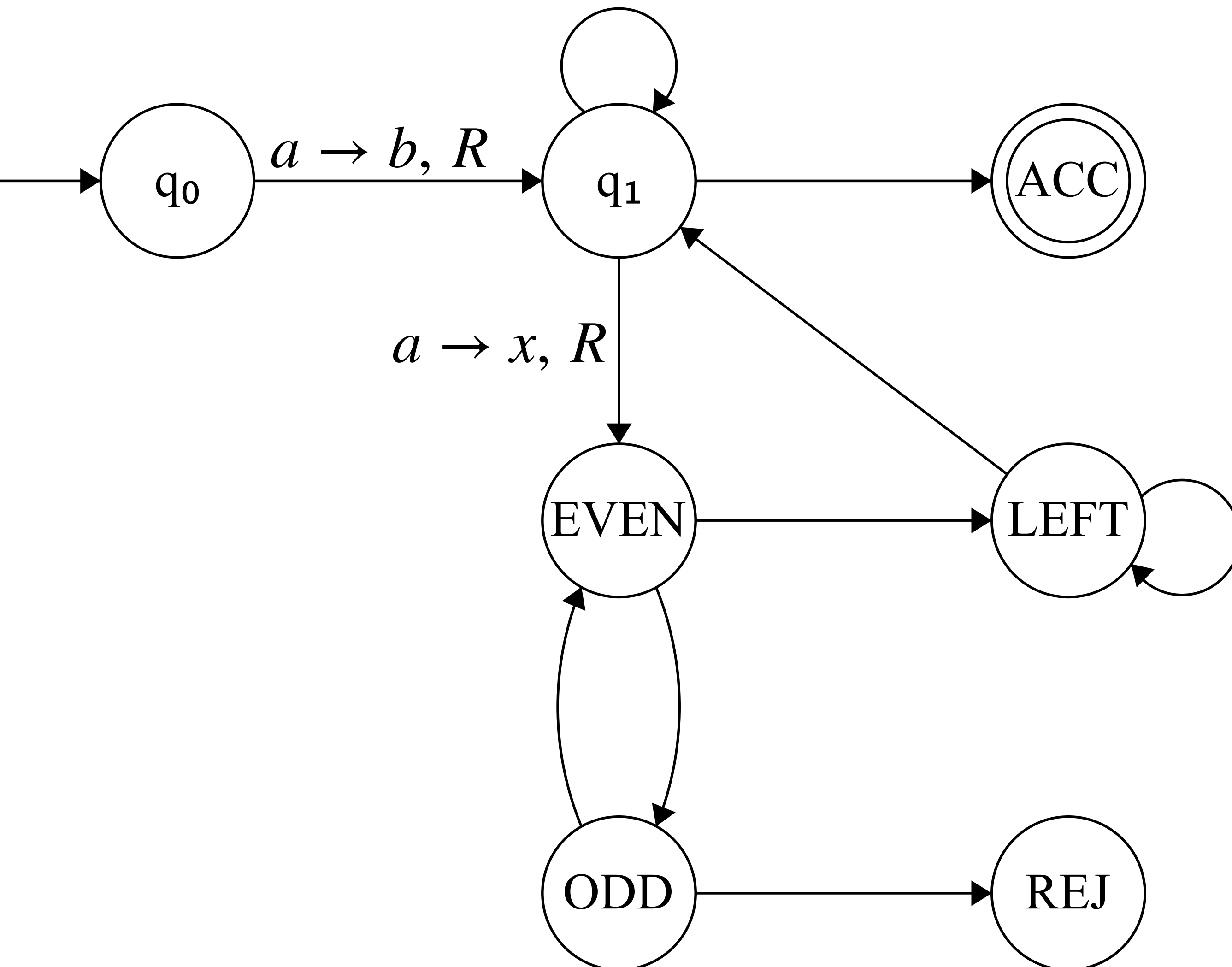
Deciding Powers of 2



On input a^m :

1. **Convert** the first a symbol to b .
2. **Scan right**, marking every other a symbol found (starting with the next a found after the b)

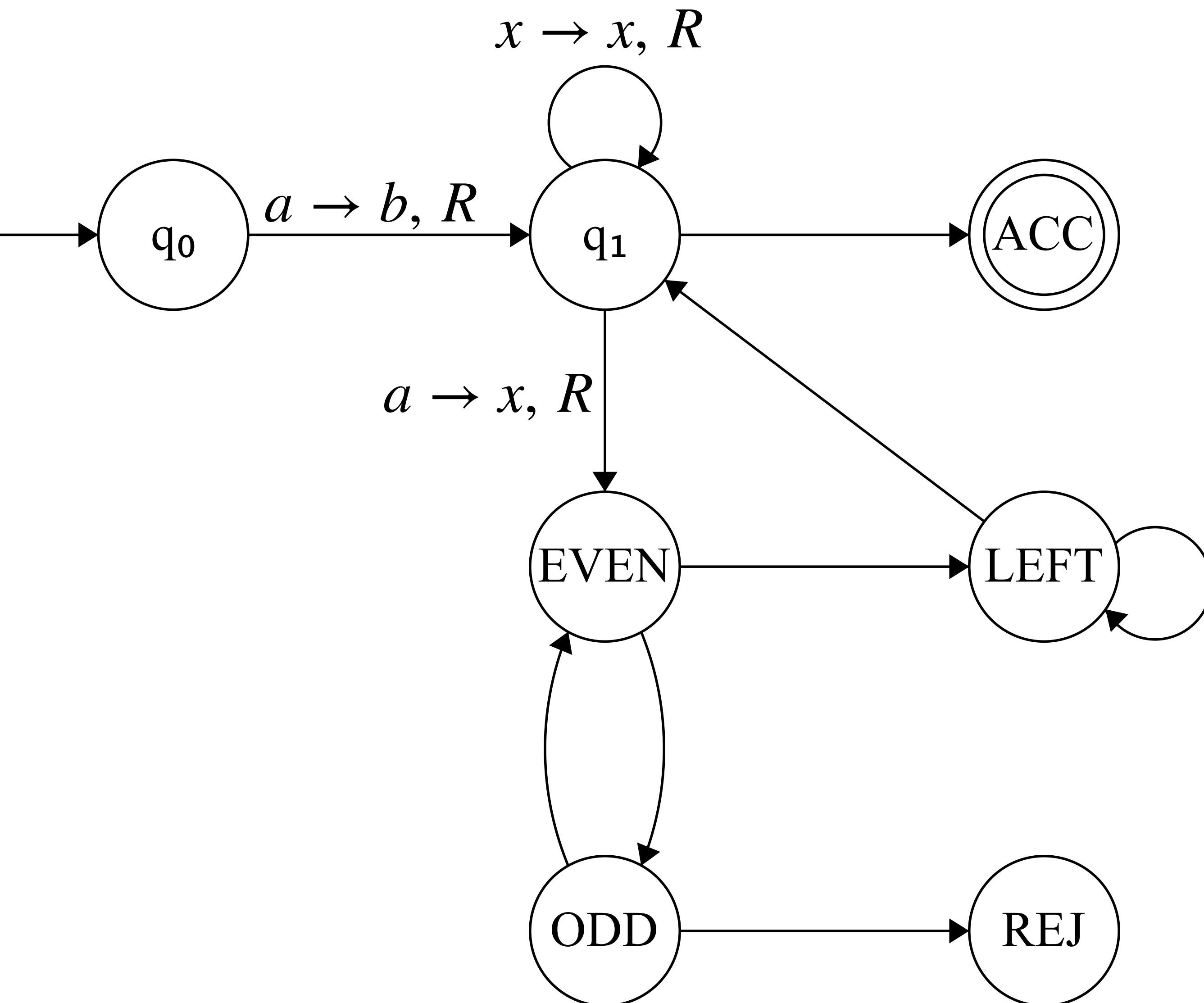
Deciding Powers of 2



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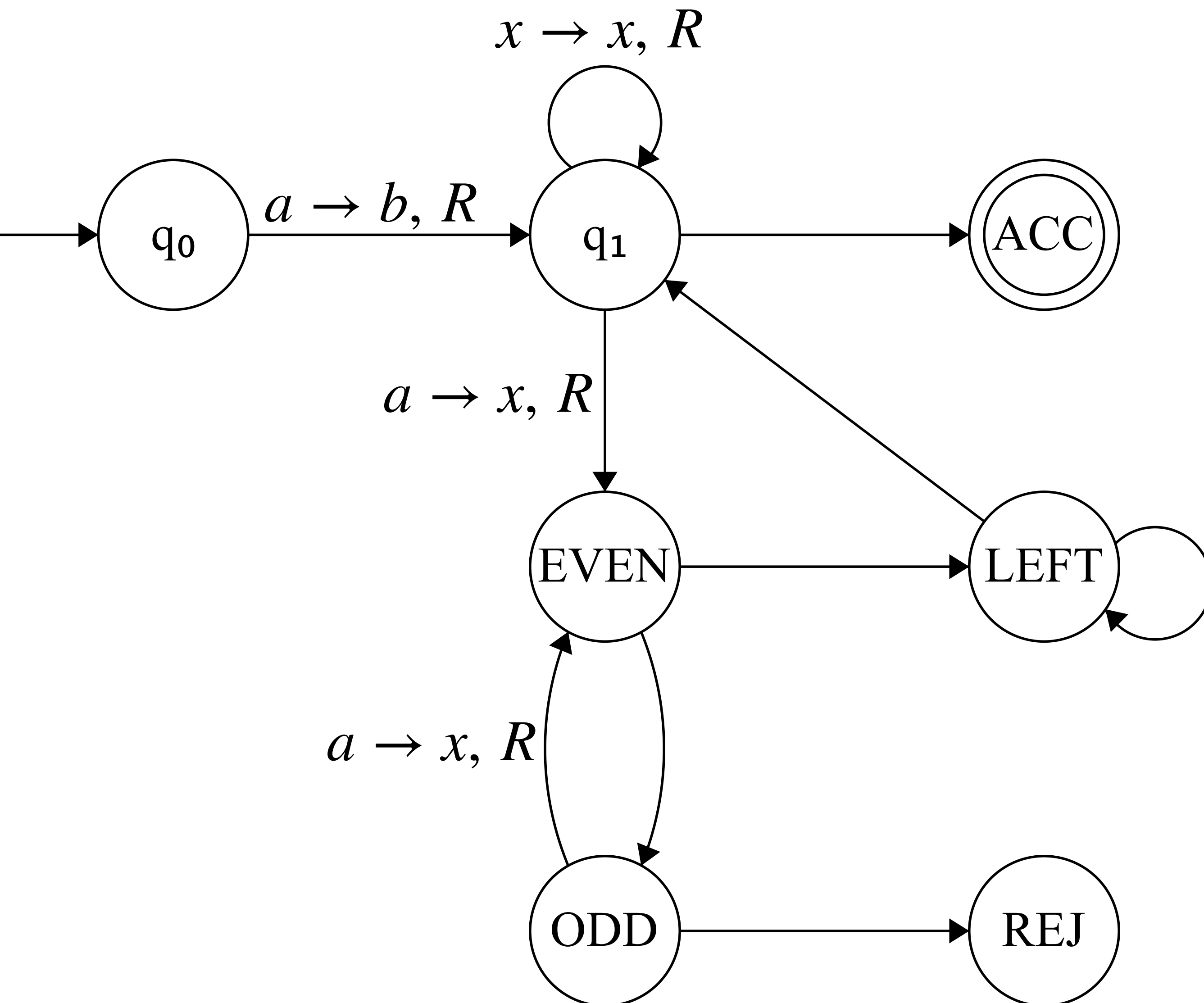
Deciding Powers of 2



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2. **Scan right**, marking every other a symbol found (starting with the next a found after the b)

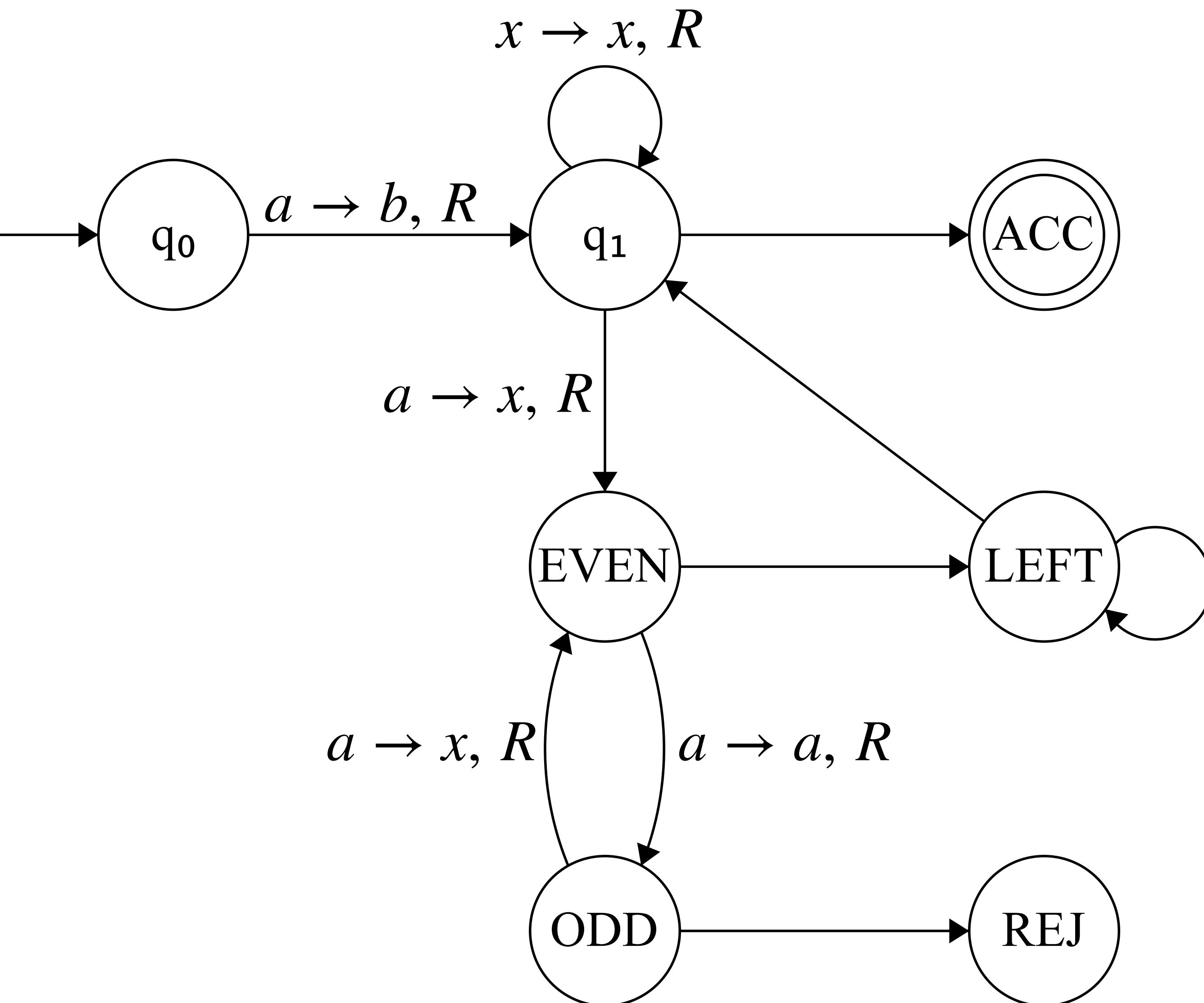
Deciding Powers of 2



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2. **Scan right**, marking every other a symbol found (starting with the next a found after the b)

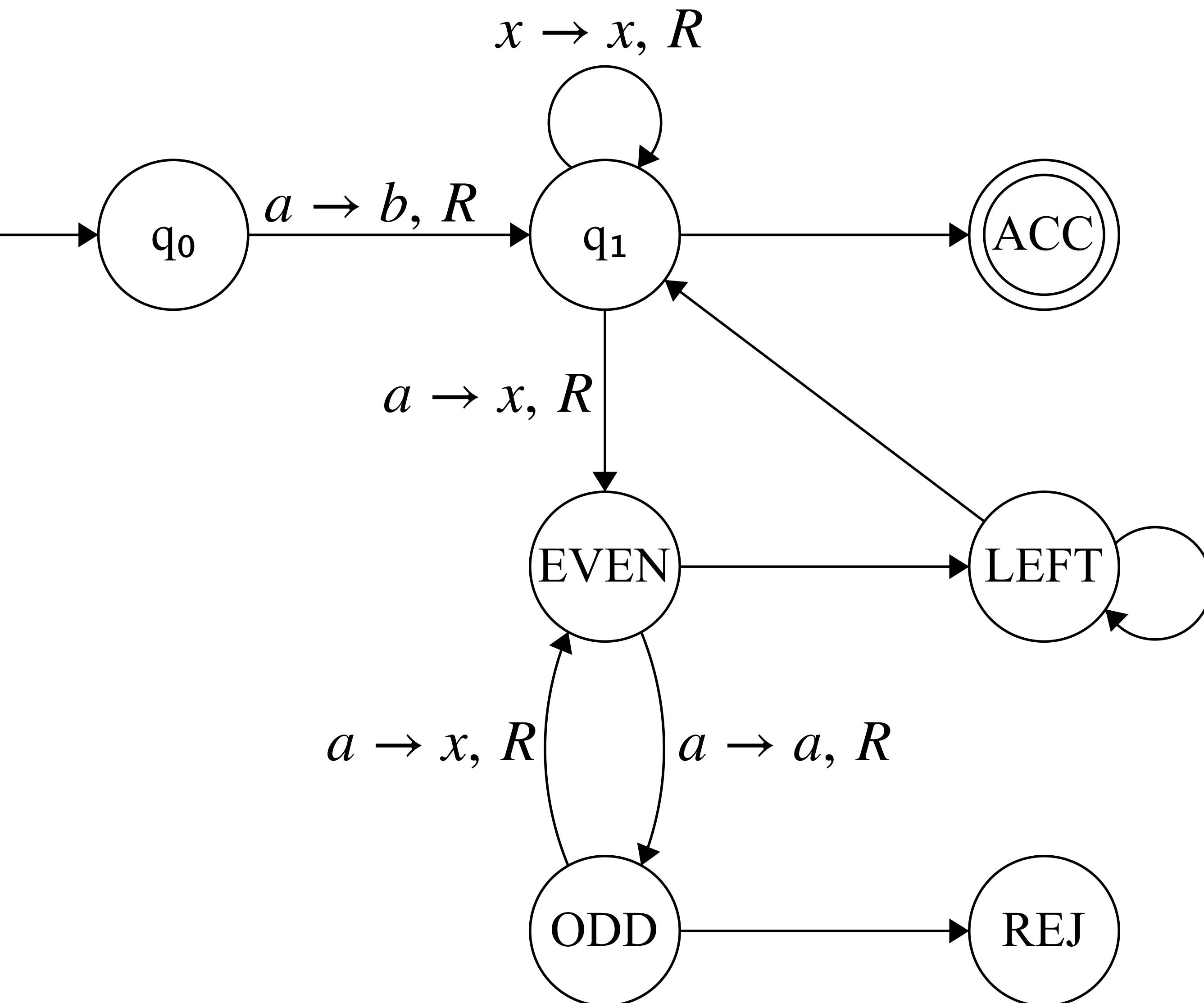
Deciding Powers of 2



On input a^m :

1. **Convert** the first a symbol to b .
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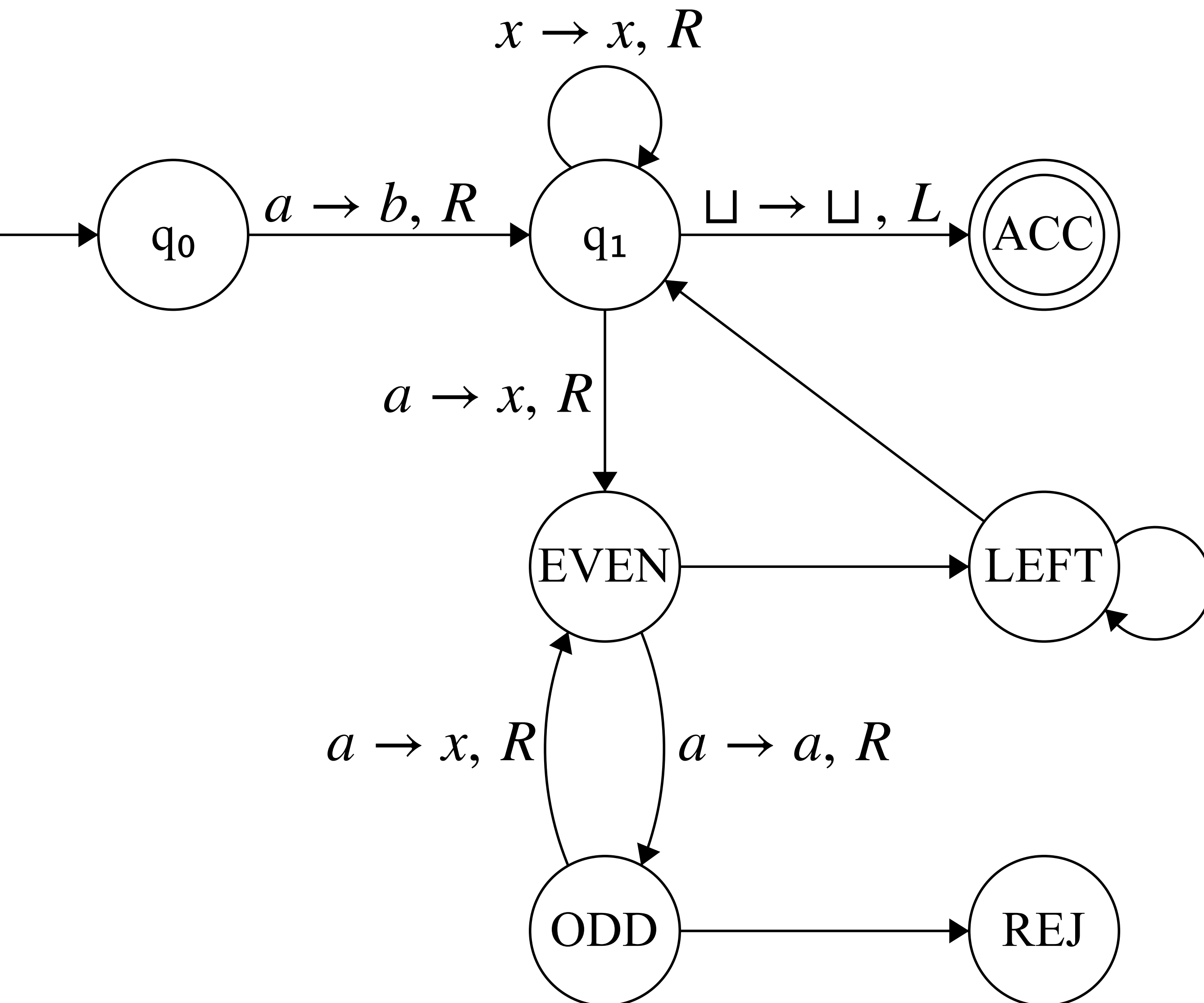
Deciding Powers of 2



On input a^m :

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3. If no a 's are found, **ACCEPT**

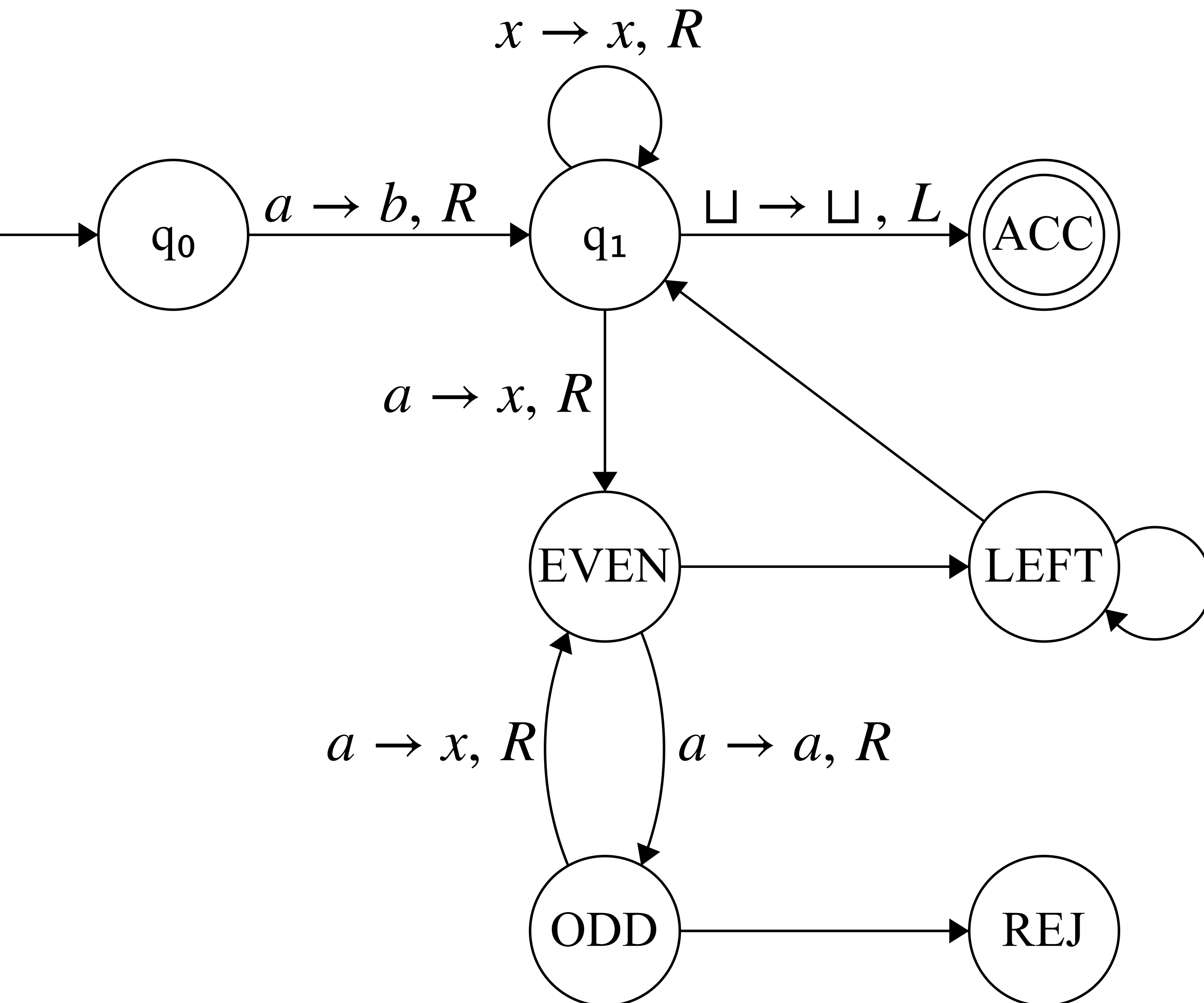
Deciding Powers of 2



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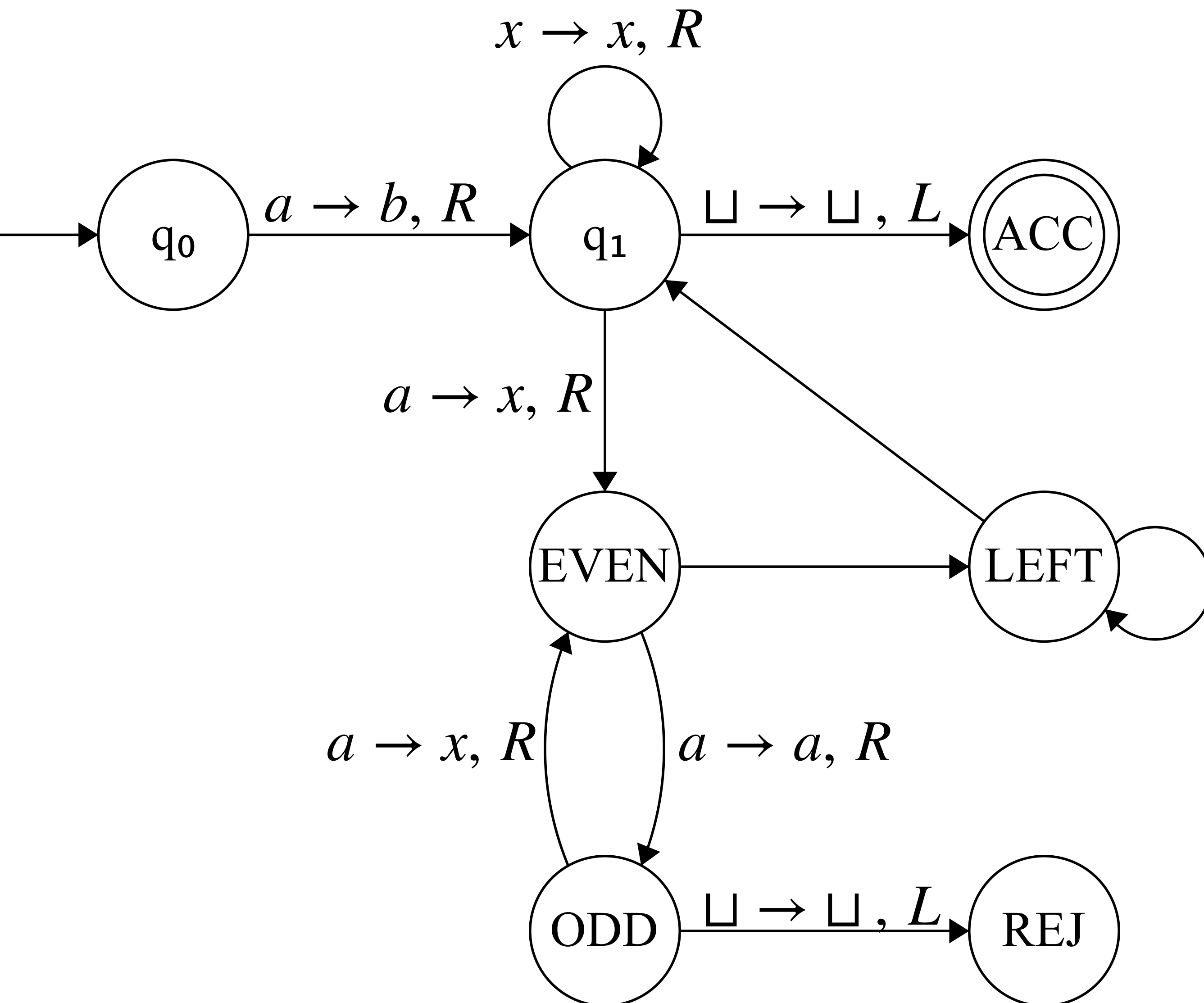
Deciding Powers of 2



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3. If no a 's are found, **ACCEPT**
4. If the last symbol before the blank is a , **REJECT**.

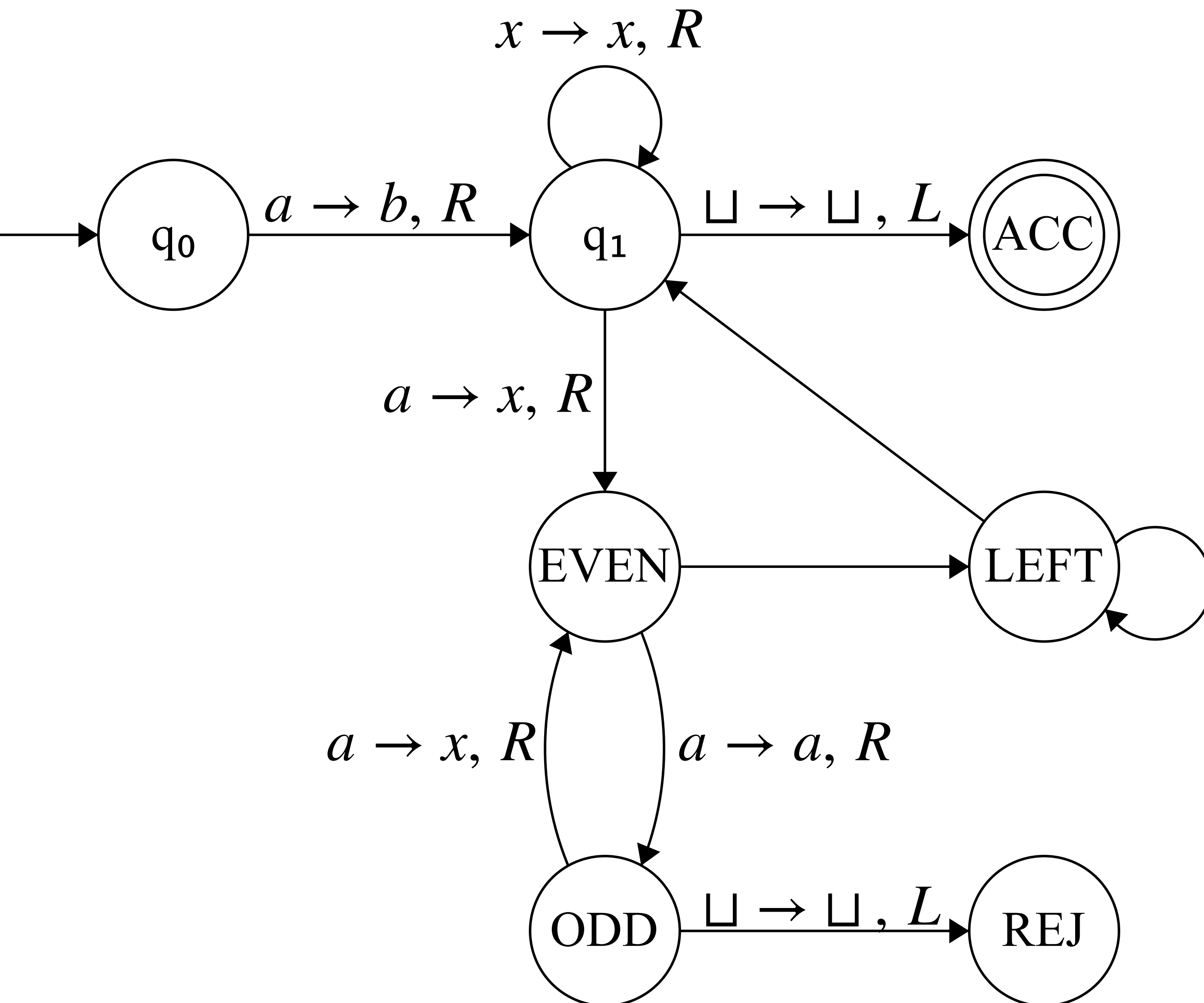
Deciding Powers of 2



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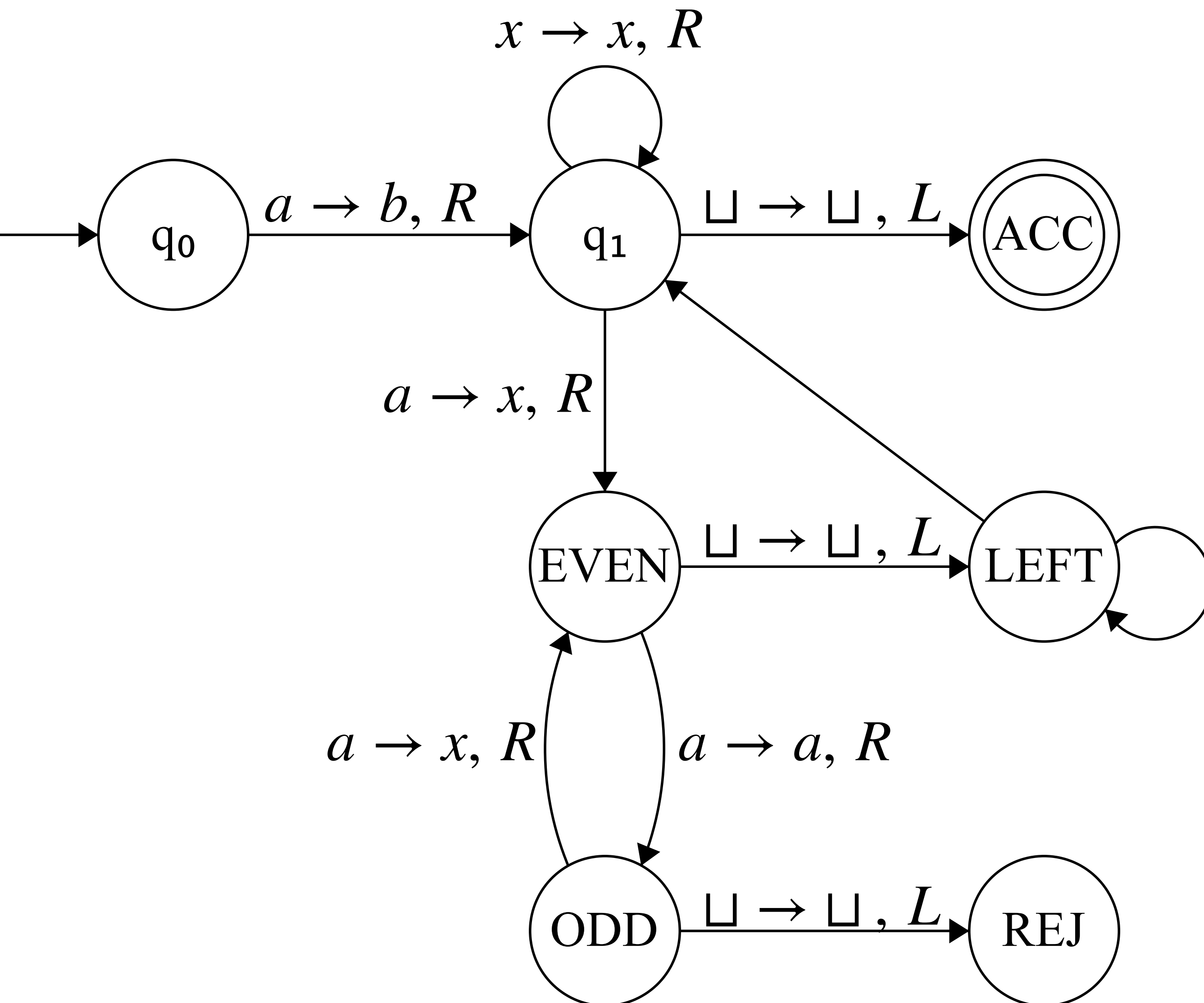
Deciding Powers of 2



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5. Otherwise, **scan left** until the cell with b is found.

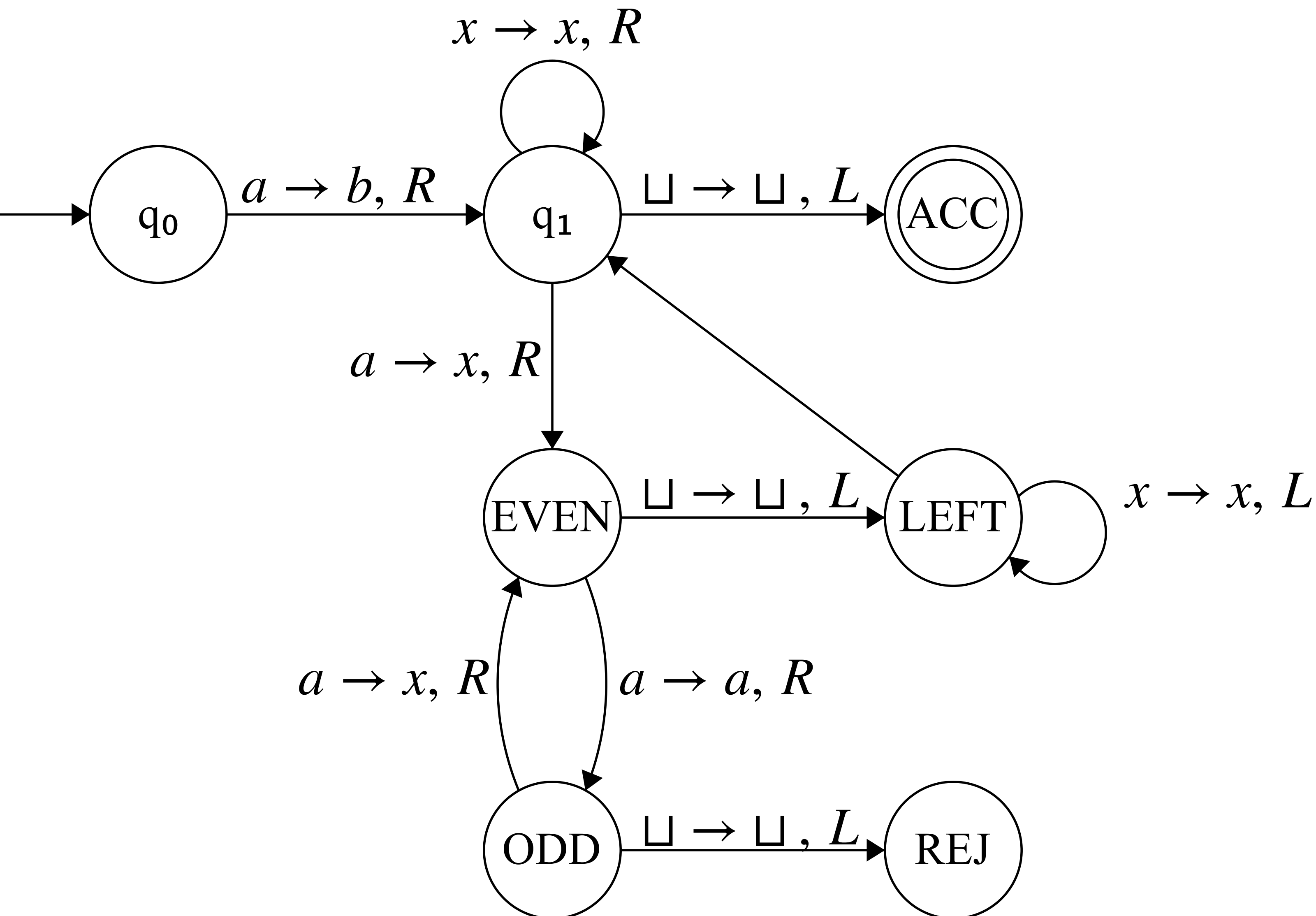
Deciding Powers of 2



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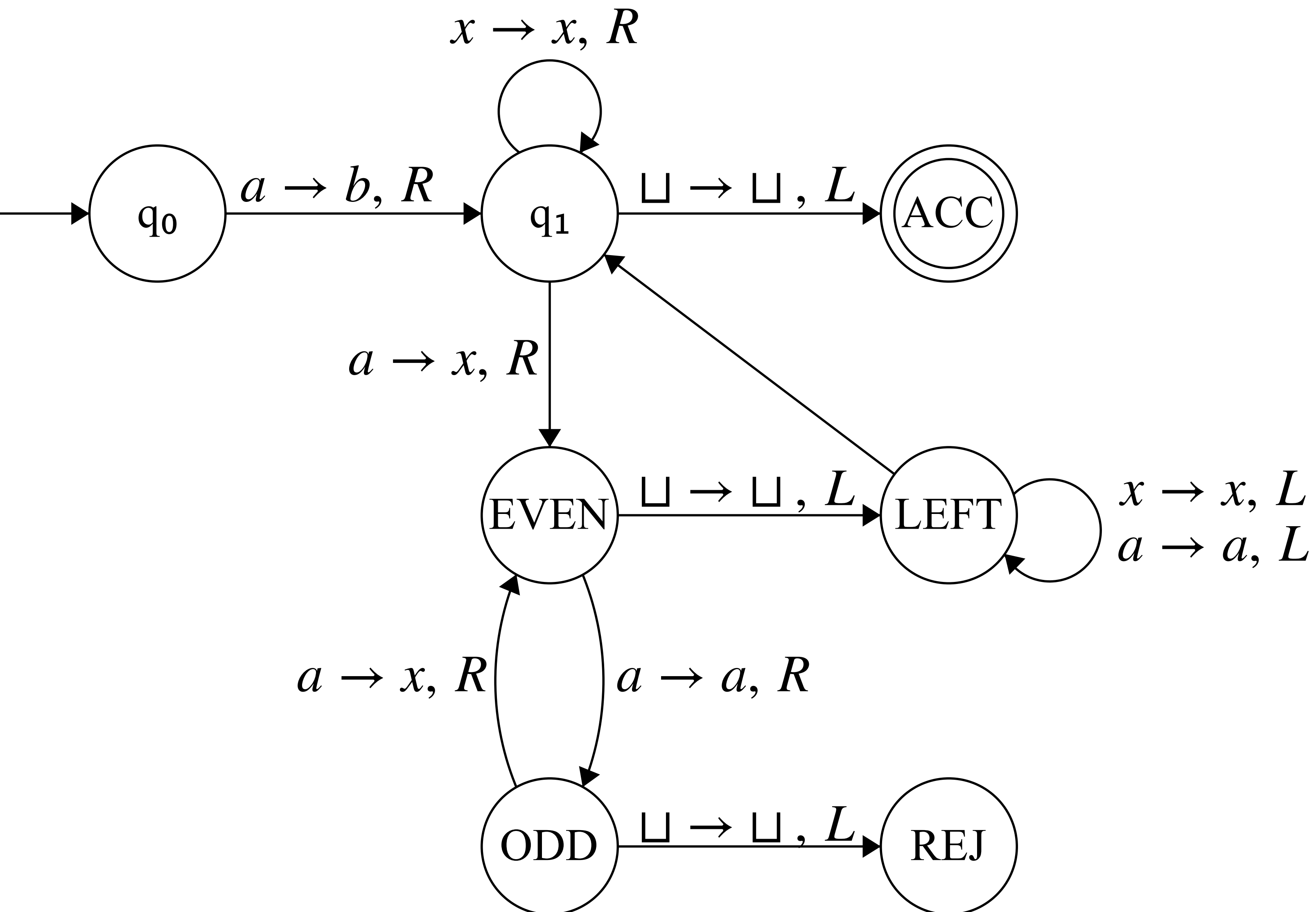
Deciding Powers of 2



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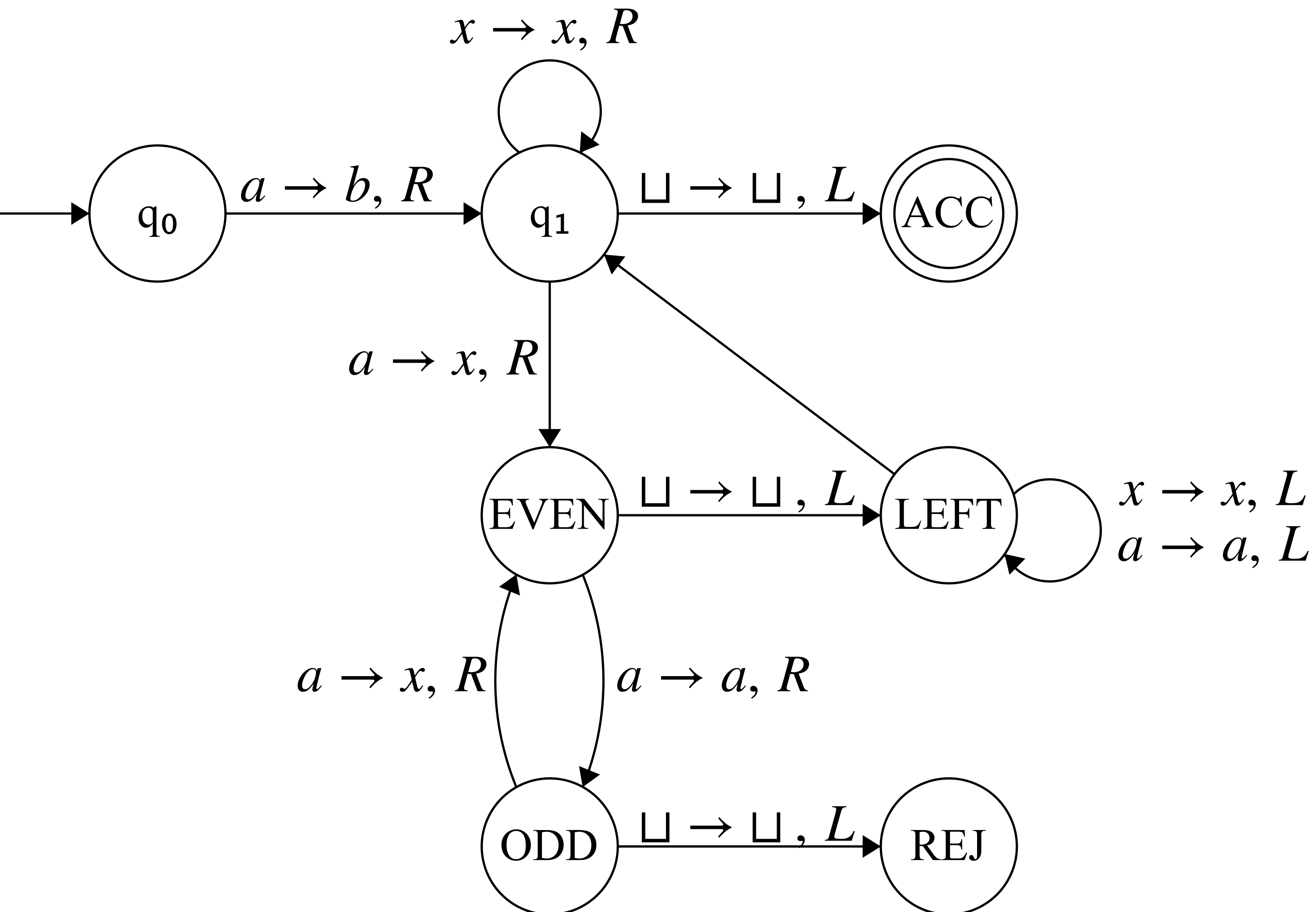
Deciding Powers of 2



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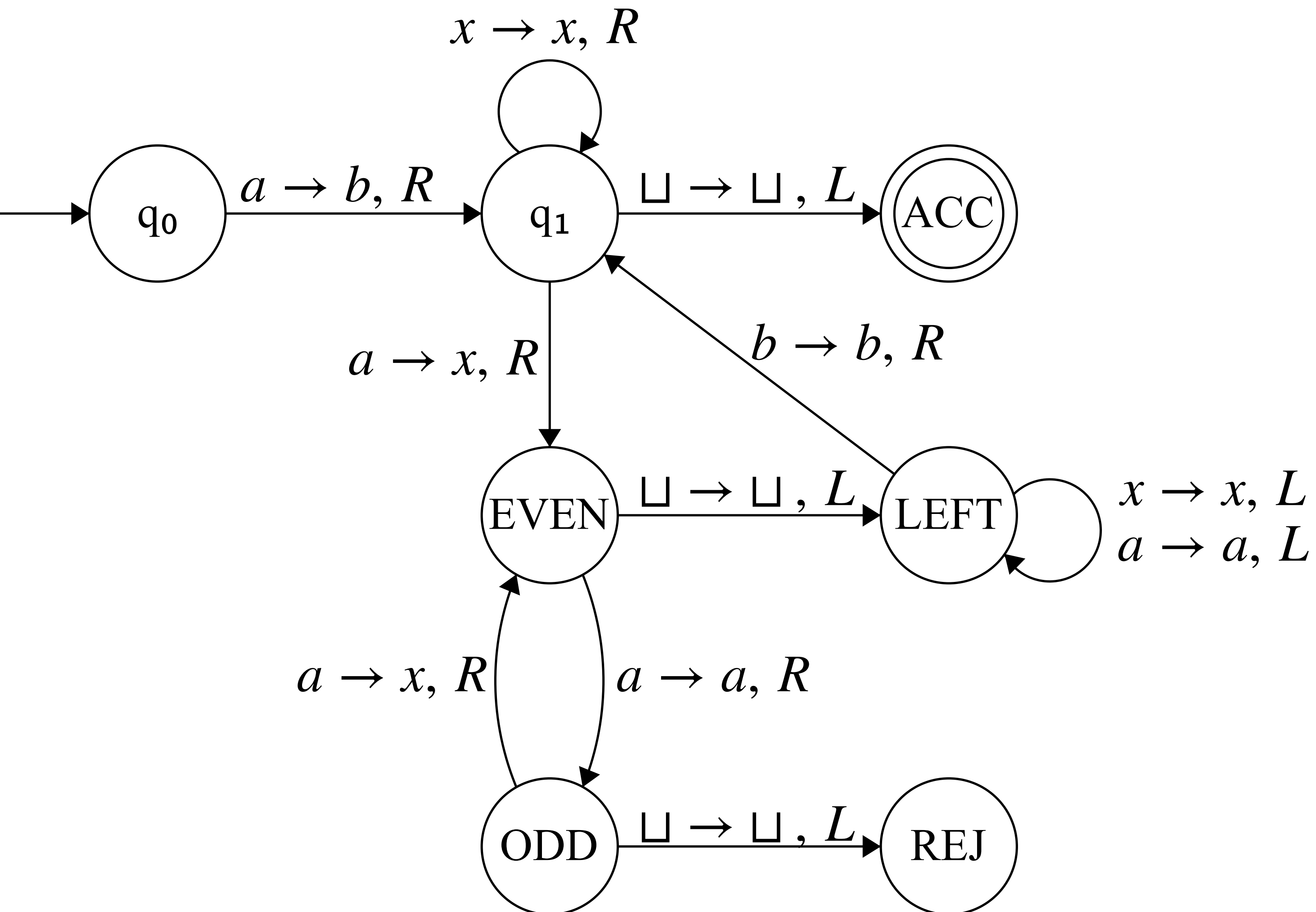
Deciding Powers of 2



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6. Return to **step 2**.

Deciding Powers of 2



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