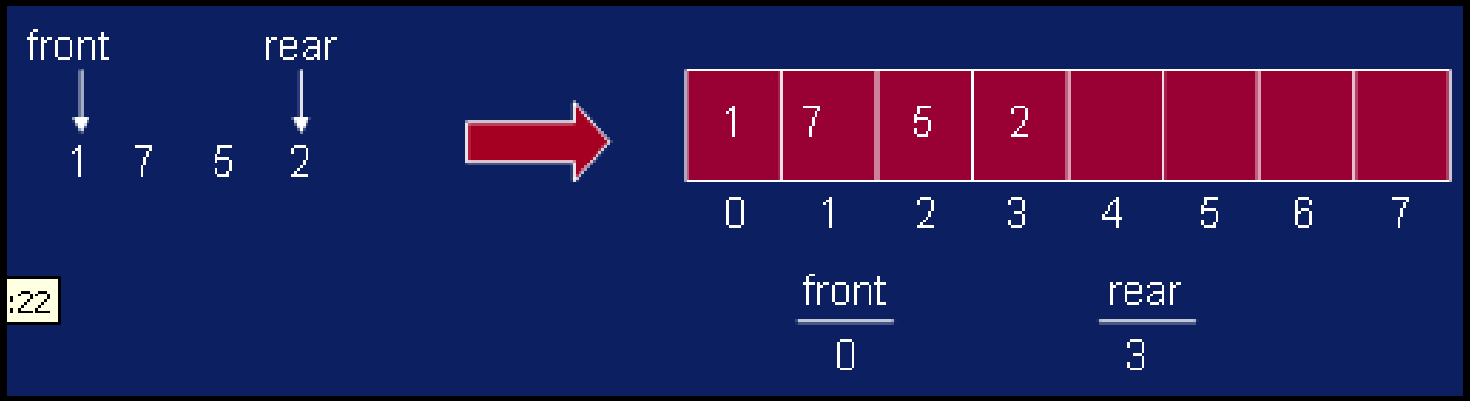
Lecture # 8

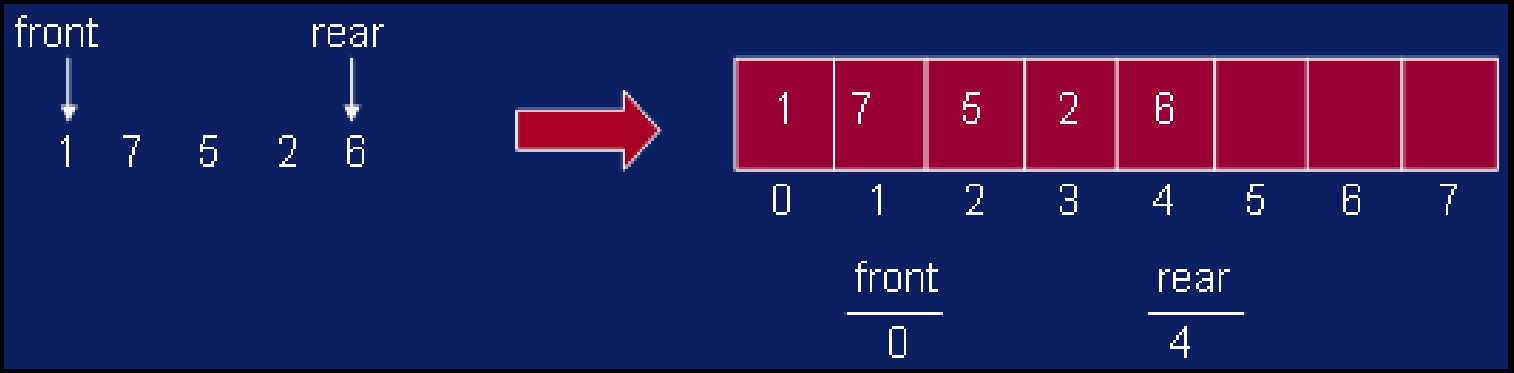
Queue using Array

- If we use an array to hold queue elements, both insertions and removal at the front (start) of the array are expensive.
- This is because we may have to shift up to "n" elements.
- For the stack, we needed only one end; for queue we need both.
- To get around this, we will not shift upon removal of an element.

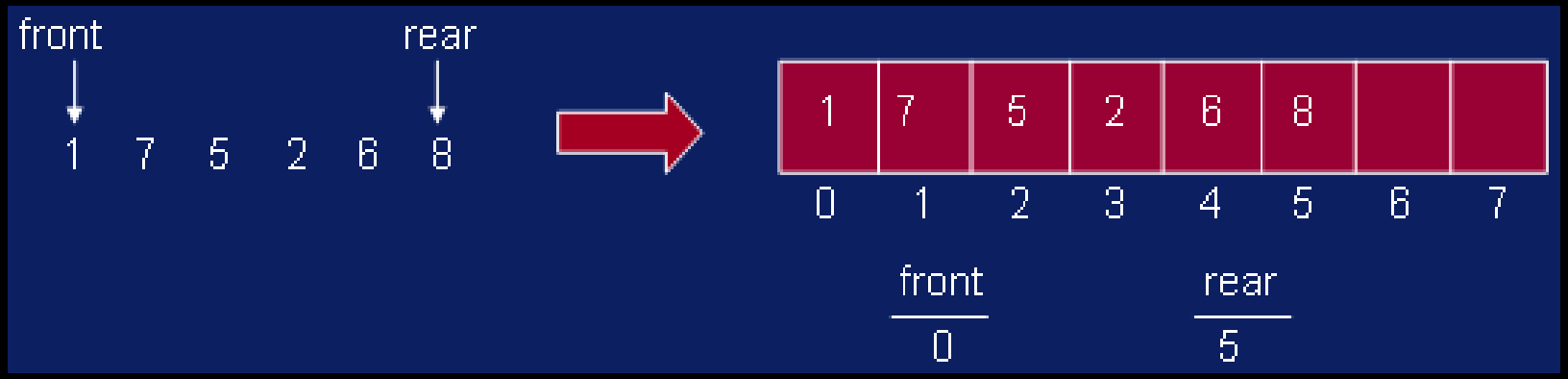
Queue using Array



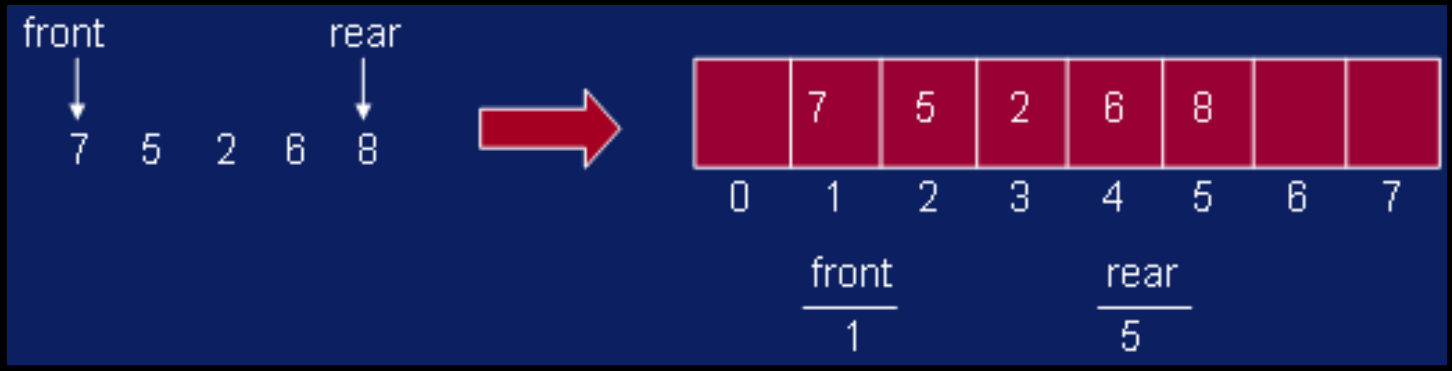
Queue using Array



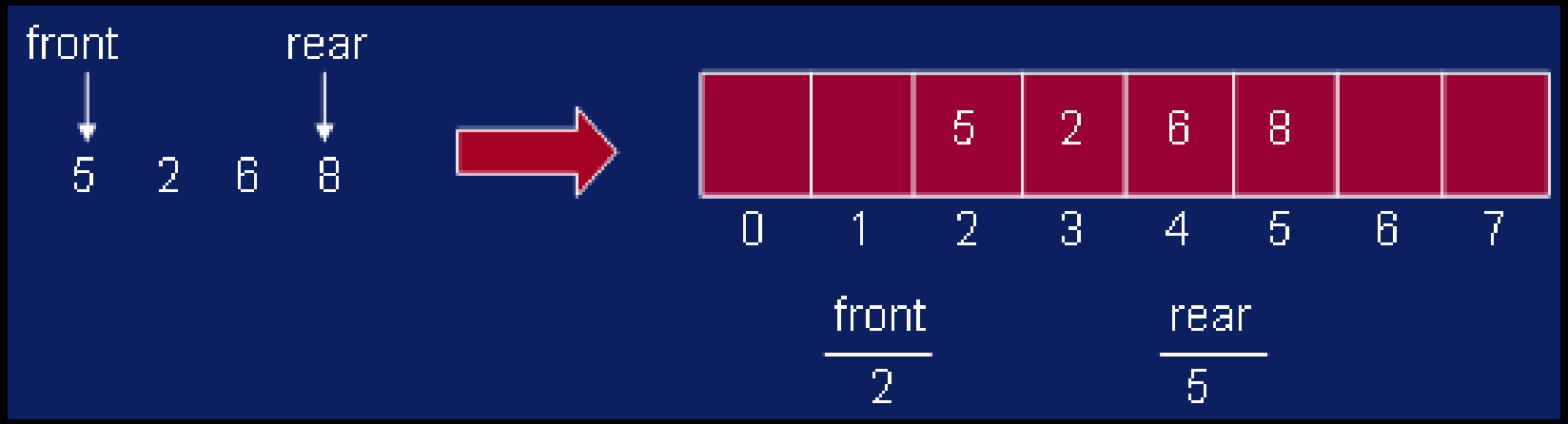
Queue using Array



Queue using Array

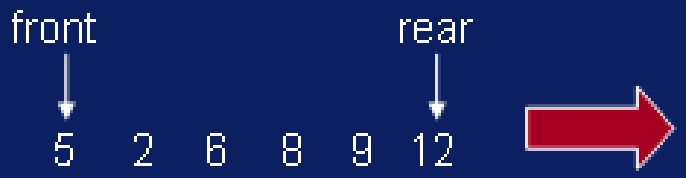


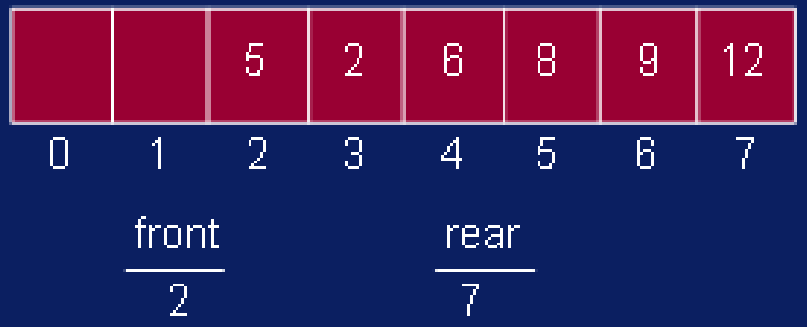
Queue using Array



Queue using Array

enqueue(9)
enqueue(12)





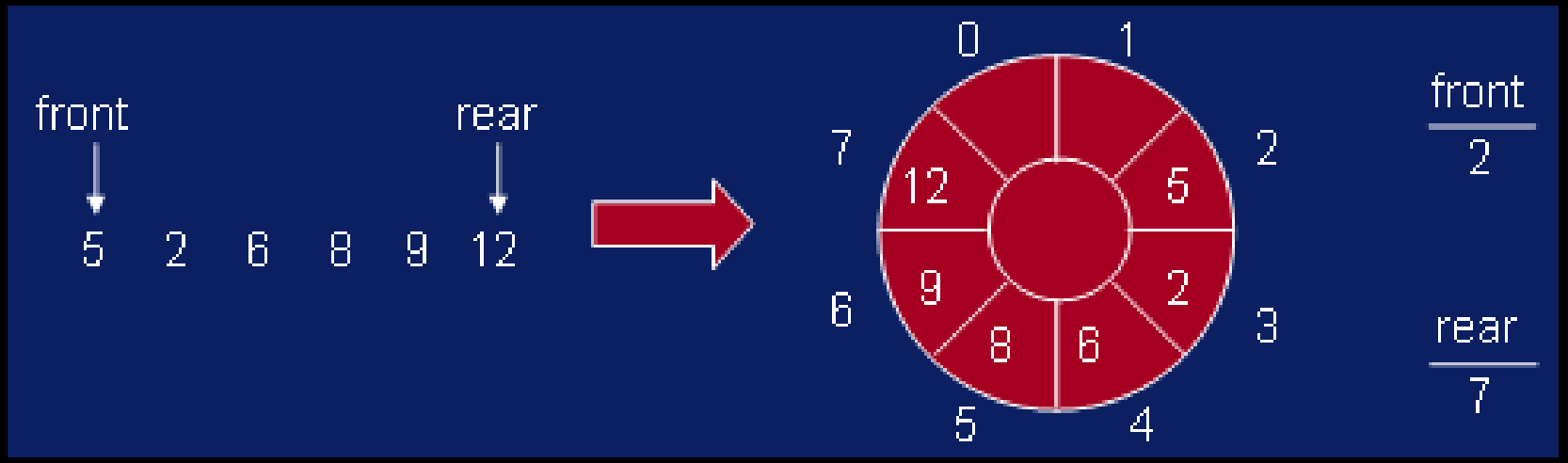
enqueue(21) ??

Queue using Array

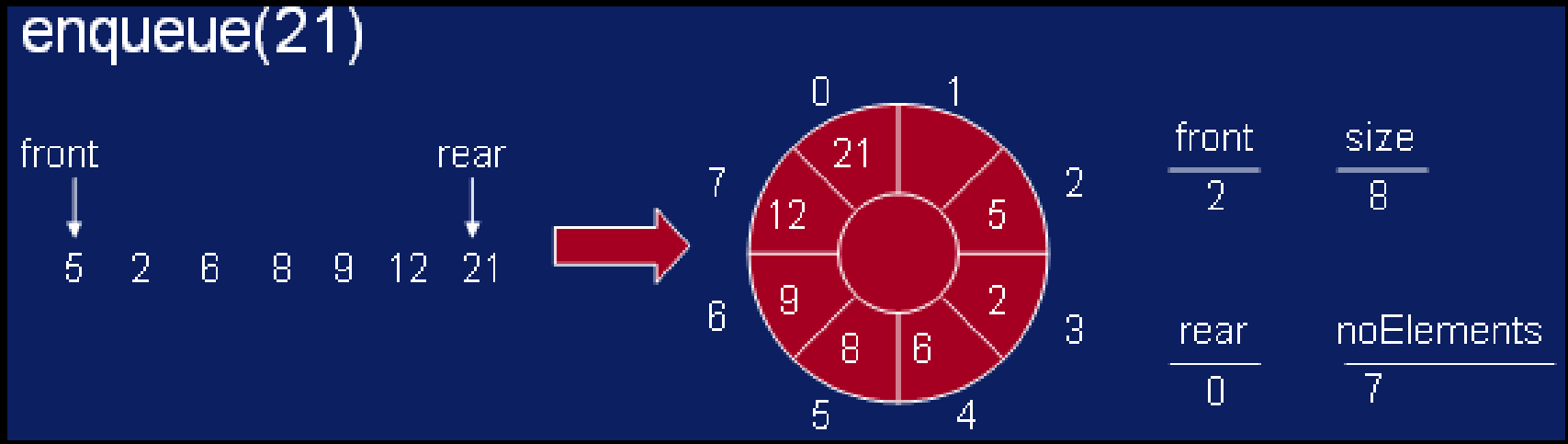
- We have inserts and removal running in constant time but we created a new problem.
- Cannot insert new elements even though there are two places available at the start of the array.
- Solution: allow the queue to “wrap around”.

Queue using Array

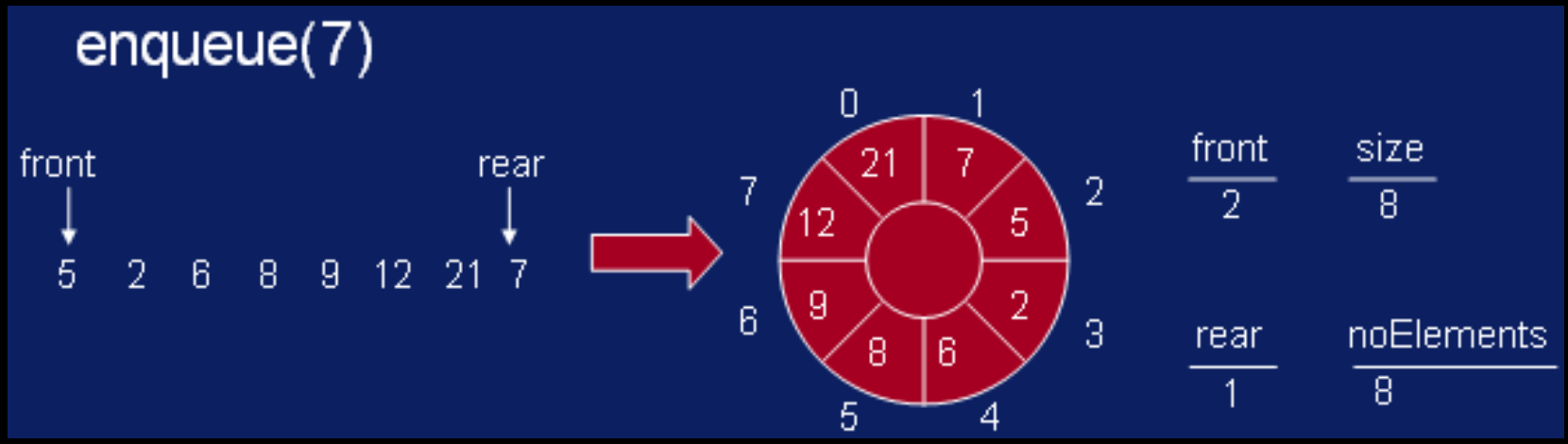
- Basic idea is to picture the array as a *circular array*.



Queue using Array



Queue using Array



Queue using Array