Today’s announcements:

MP6 available, due 11/17, 11:59p.

Secret mystery data structure:

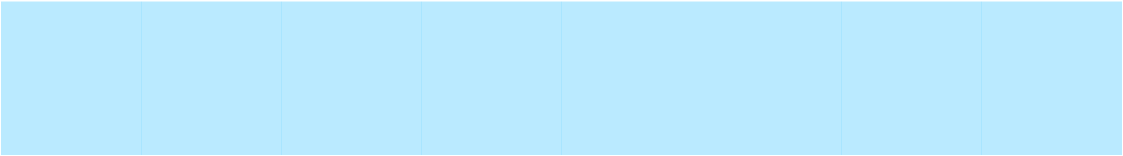
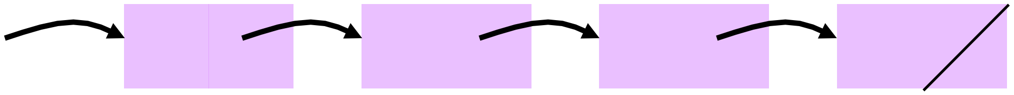
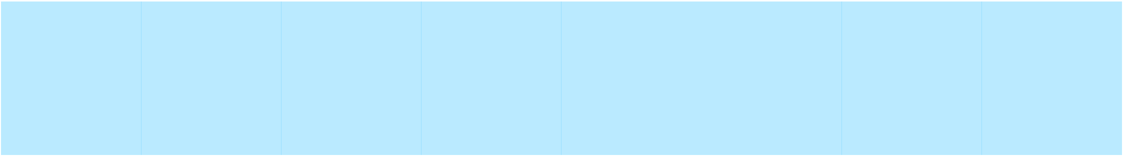
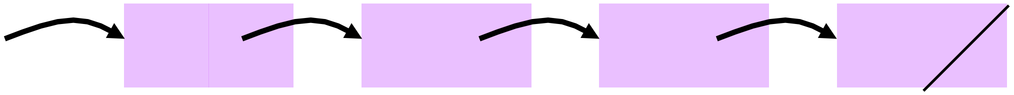
ADT - ________________

insert

remove

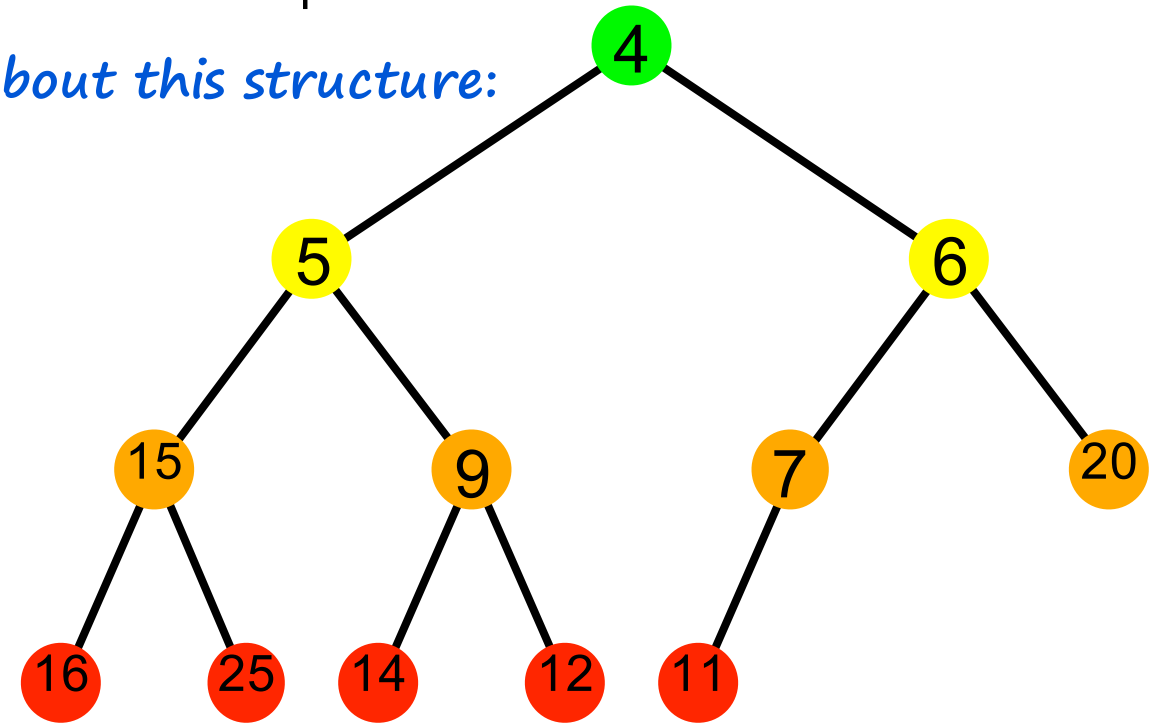
getSize

Priority Queue ADT:

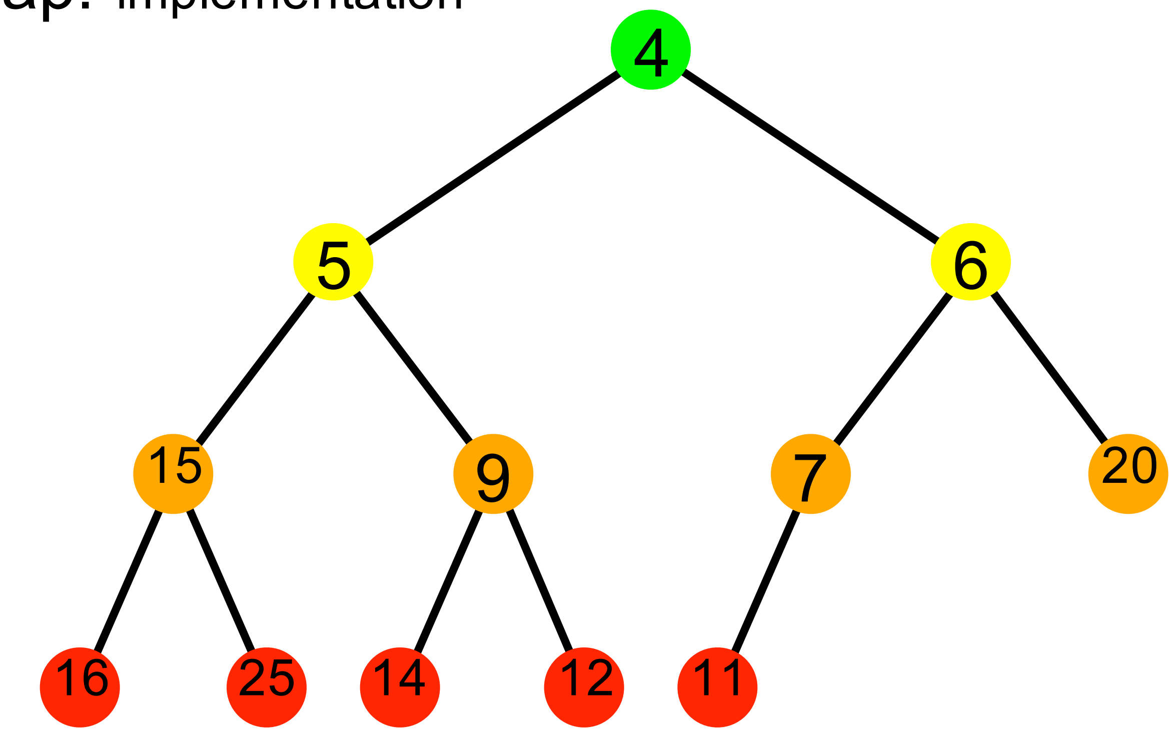
insert	removeMin	implementation
O(n)	O(n)	 unsorted
O(1)	O(n)	
O(log n)	O(1)	 sorted
O(log n)	O(1)	

Priority Queue: another implementation option

Tell me everything you can about this structure:

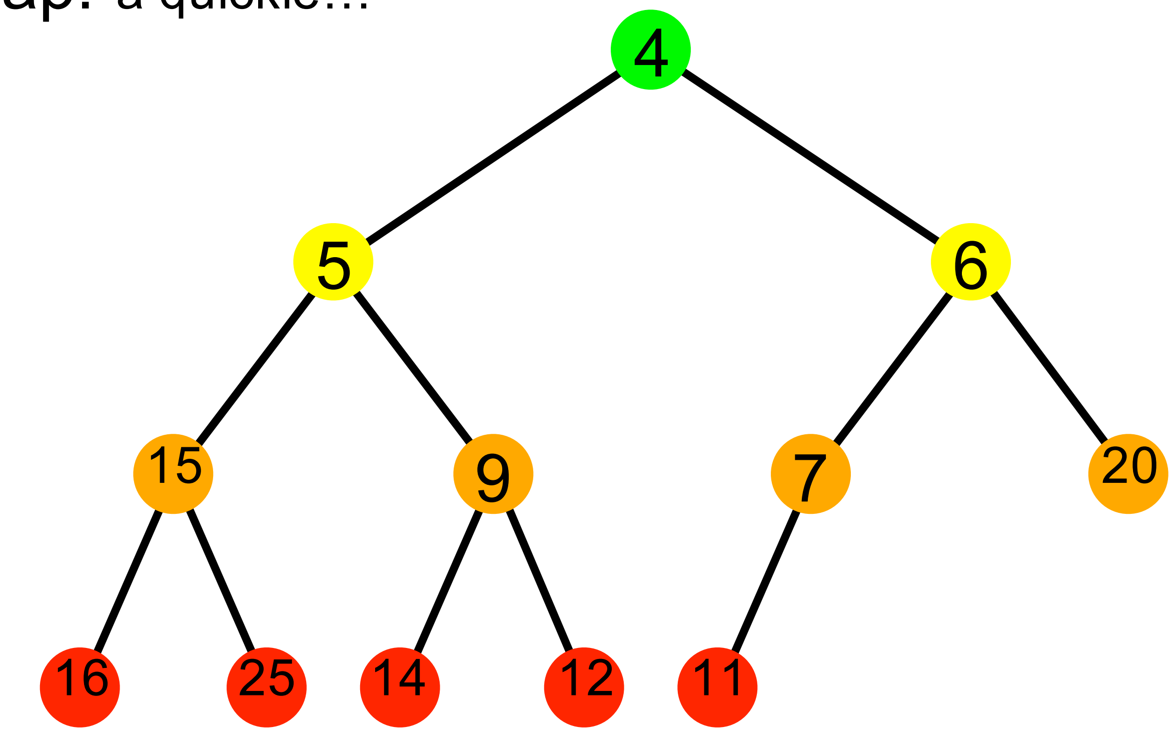


(min)Heap: implementation



4	5	6	15	9	7	20	16	25	14	12	11

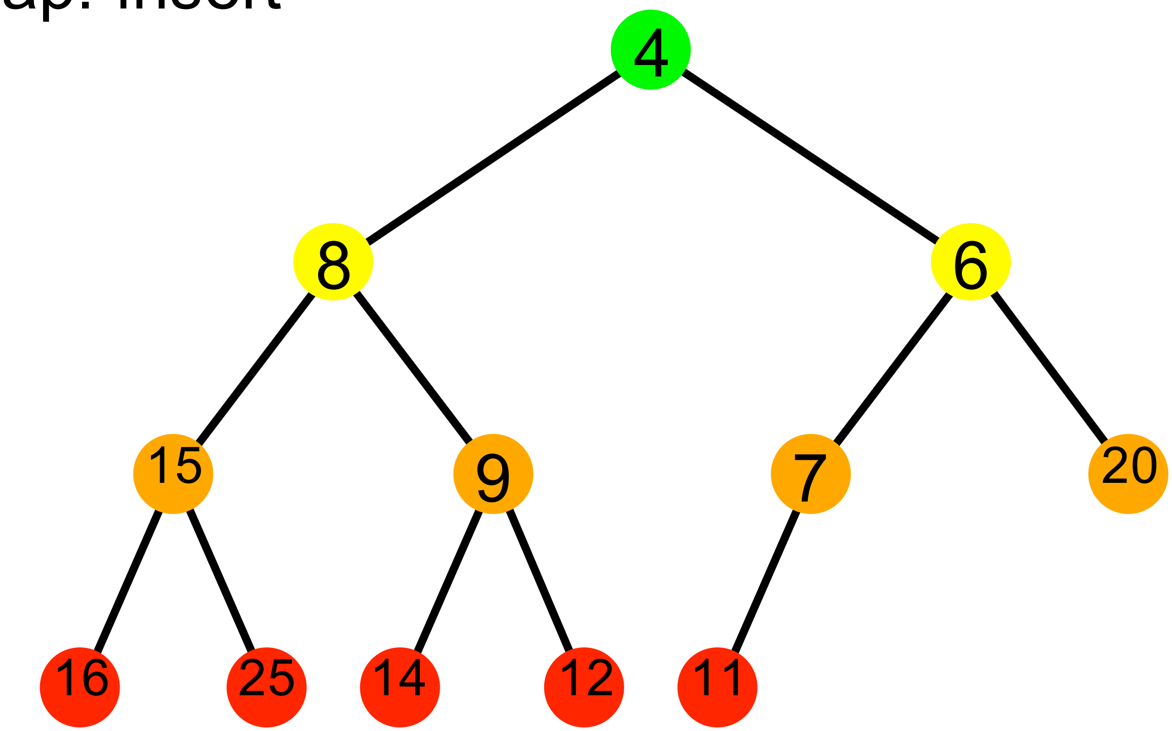
(min)Heap: a quickie…



4	5	6	15	9	7	20	16	25	14	12	11

What is the max height of a complete tree containing n nodes?

(min)Heap: insert



4	8	6	15	9	7	20	16	25	14	12	11			

http://people.ksp.sk/~kuko/bak/index.html

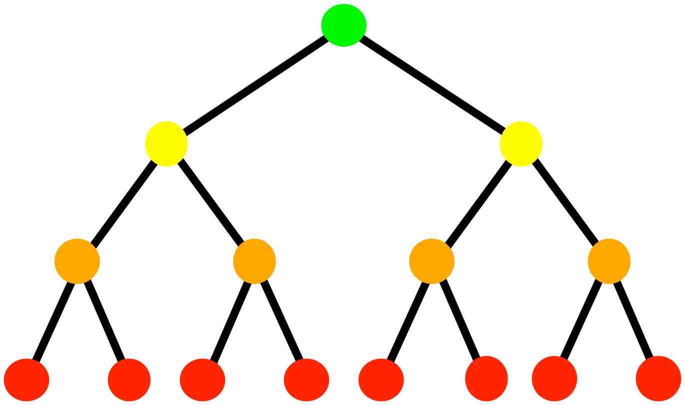
Code:

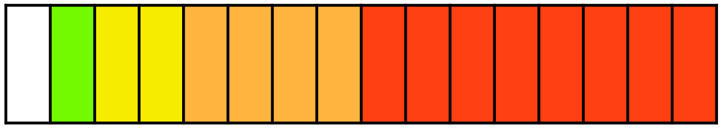
```
template <class T>
void Heap<T>::insert(const T & key){

   if (size==capacity) growArray();
   size++;
   items[size] = key;
   heapifyUp(size);

}
```

growArray()





Code:

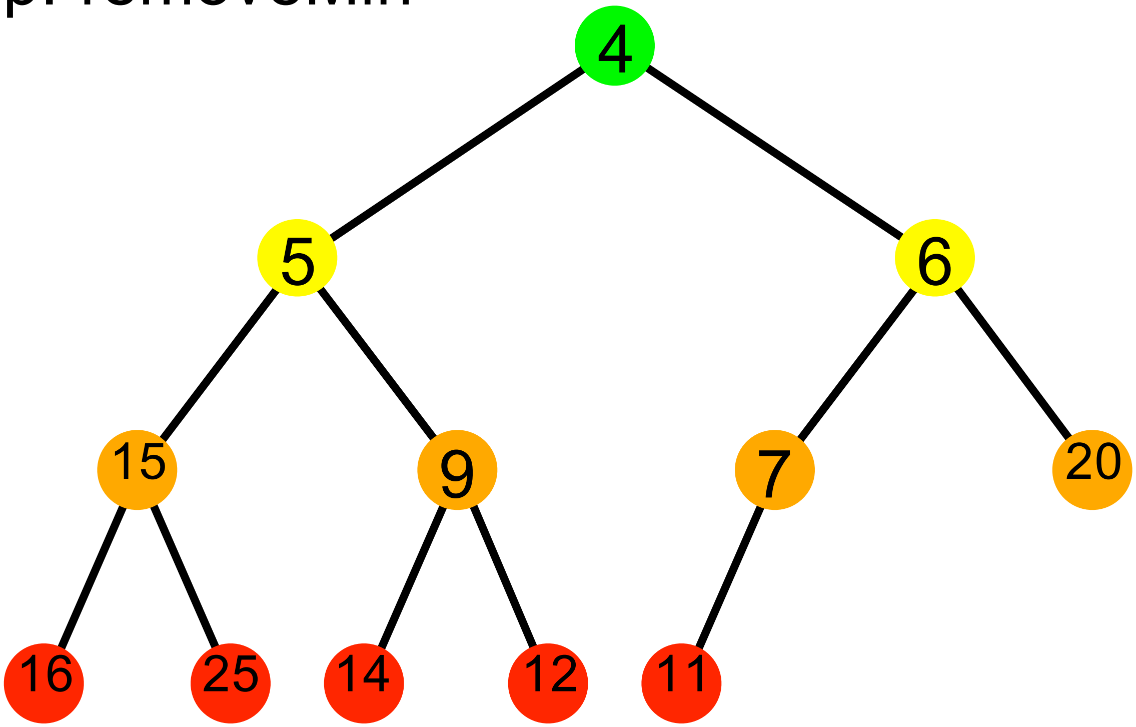
```
template <class T>
void Heap<T>::insert(const T & key){

   if (size==capacity) growArray();
   size++;
   items[size] = key;
   heapifyUp(size);

}
```

```
template <class T>
void Heap<T>::heapifyUp(int cIndex){
   if (cIndex > ___){
      if (items[cIndex] ___ items[parent(cIndex)]{
         swap(_______________,_______________);
         heapifyUp(_______________);
      }
   }
}
```

(min)Heap: removeMin



4	5	6	15	9	7	20	16	25	14	12	11

Code:

```
template <class T>
T Heap<T>::removeMin(){
   T minVal = items[1];
   items[1] = items[size];
   size--;
   heapifyDown(1);
   return minVal;
}
```

Code:

```
template <class T>
T Heap<T>::removeMin(){
   T minVal = items[1];
   items[1] = items[size];
   size--;
   heapifyDown(1);
   return minVal;
}
```

```
template <class T>
void Heap<T>::heapifyDown(int cIndex){
   if (hasAChild(cIndex)){
      minChildIndex = minChild(cIndex);
      if (items[cIndex] ____ items[minChildIndex]{
         swap(_____________,______________);
         _______________________;
   }
}
```

What have we done?