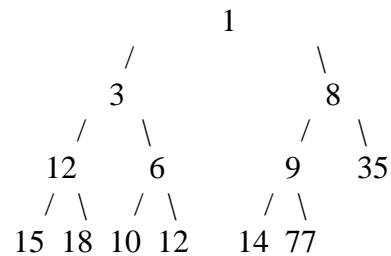


Computer Science I – Summer 2011
Recitation #11: Heaps

1) In an array-based implementation of a Heap, the left-child of the left-child of the node at index i , if it exists, can be found at what array location?

2) In an array-based implementation of a Heap, the right-child of the right-child of the node at index i , if it exists, can be found at what array location?

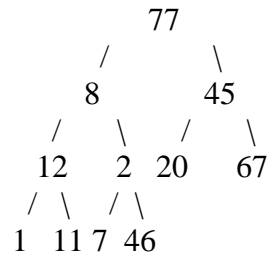
3) Show the result of inserting the item 7 into the heap shown below:



4) Show the result of removing the minimum element from the original heap in question #2 (without 7) from above.

5) Show the array representation of the original heap from question #2.

- 6) Run the whole Make Heap function on the following random values:
(this is the function that builds a heap in $O(n)$ time)



- 7) Explain each step shown in the code below, for the percolateDown function:

```
void percolateDown(struct heapStruct *h, int index) {  
  
    int min;  
  
    if ((2*index+1) <= h->size) {  
  
        min = minimum(h->heaparray[2*index], 2*index, h->heaparray[2*index+1], 2*index+1);  
  
        if (h->heaparray[index] > h->heaparray[min]) {  
            swap(h, index, min);  
            percolateDown(h, min);  
        }  
    }  
    else if (h->size == 2*index) {  
        if (h->heaparray[index] > h->heaparray[2*index])  
            swap(h, index, 2*index);  
    }  
}
```

(Note: Please reference `heap.c` without looking at this function, if necessary.)