1. Draw the resulting min-heap after a \texttt{removeMin()} call to the following min-heap.

```
4
  
9
  
7
  12
  
10 80 12 13 8 91 15 27 71
  
54 11
```

2. Write the array representation of the following min-heap.

```
A
  
B  K
  
C X M N
  
D
```

3. If the sequence \([1, 5, 18, 22, 31, 32, 36, 43, 46, 55, 56, 57, 83, 88]\) represents a min-heap in an array, answer the following:
   (a) what is the right child of 22: ______
   (b) what is the left child of 32: ______
   (c) what is the parent of 55: ______
   (d) what is the left child of 43: ______

4. Consider three sorting algorithms.
   - Algo A: requires only 1 additional memory location to store a temp variable,
   - Algo B: requires 100 additional memory locations as its axillary storage, and
   - Algo C: requires additional memory that is equivalent to \((1/100)^{th}\) times the input size \(n\).

Which of the following statements are true? (select all that apply):
   A. Algo A is an in-place and stable sorting algorithm
   B. Algo B is an in-place sorting algorithm
   C. Algo C is an in-place
5. Consider the following four sorting algorithms and their properties.

- **Algo A**: Worst-case $O(n^2)$, average-case $O(n \log n)$, space: $O(1)$ stable, not in-place.
- **Algo B**: Worst-case $O(n \log n)$, average-case $O(n \log n)$, not-stable, in-place.
- **Algo C**: Worst-case $O(n^2)$, average-case $O(n^2)$, stable, in-place.
- **Algo D**: Worst-case $O(n^2)$, average-case $O(n \log n)$, not-stable, not in-place.

Given the same input to all these four algorithms, output of ______________ algorithms would be the same. (select all that apply from the choices below)

A. A, B, C, and D (all are sorting algorithms after all!)
B. B, C
C. A, D
D. A, C
E. Other