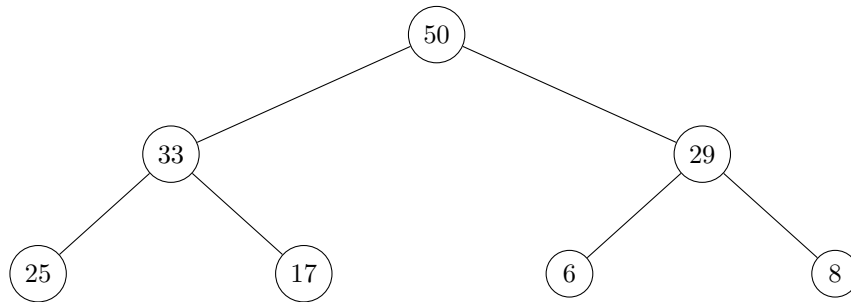


Tutorial 04: June 5

1. **deleteMax on Maxheap**

Perform 2 `deleteMax` operations on given heap.

2. **Average-case Analysis**

Let A and B be two bitstrings of length n (modelled here as arrays where each entry is 0 or 1). A *string-compare* tests whether A is smaller, larger, or the same as B and works as follows:

```

str-cmp(A, B, n)
  for (i = 0; i < n; i++) {
    if (A[i] < B[i])
      return "A is smaller"
    if (A[i] > B[i])
      return "B is smaller"
  }
  return "They are equal"

```

Show that the average-case run-time of `str-cmp` is in $O(1)$. You may use without proof that $\sum_{i \geq 0} \frac{i}{2^i} \in O(1)$.

3. **Replace Item in Max Heap**

Suppose we have a max heap, H . We would like to "inject" a value k into H at index i that will overwrite the original value at i . Design an efficient algorithm to do so while preserving the heap properties, justify correctness, and analyze this algorithm's runtime.