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1.
3 / N
89
√N
N log(log(N))
N
N log N
N log^2 N
N^1.5
N^2
N^2 log(N)
2^(N/2)
2^N

2.
O(20) = 35, O(100) = 175 seconds
O(20 + log(20) = 35, O(100 + log(100)) = 167.59 seconds
O(20^2) = 35, O(100^2) = 875 seconds
O(2^20) = 35, O(2^100) = 4.23 * 10^25 seconds

3.
2 * [¼ + 2/16 + 3/64 + 4/256….]
= 2 * [¼ + 1/16 + 1/64 + 1/256….] + [¼ + 1/16 + 1/64 + 1/256….] + [¼ + 1/16 + 1/64 + 1/256….]
= 2 * [(¼ / (1-¼)) + (1/16 / (1-¼)) + (1/64 / (1-¼)) + (1/256 / (1-¼)) +….]
= 2 * [(¼ / (3/4)) + (1/16 / (3/4)) + (1/64 / (3/4)) + (1/256 / (3/4)) +….]
= 2 * [4/3 (¼ + 1/16 + 1/64 + 1/256 + …]
= 2 * [4/3 (¼ / 3/4)]
= 2 * (16/9 (¼))
= 2 * (16/9 (¼))
= 8/9

4.
```
int getHeight(Node* head){
	int nodes = 0;

	if(pLeft != nullptr){
		nodes++;
		nodes += getHeight(pLeft);
	}

	if(pRight != nullptr{
```

```
            nodes++;
            nodes += getHeight(pRight);
          }
          return nodes;
}
```

5.

```
int movesReq = (n*n) -1;
for(int i = 1; i < movesReq; i++):
        if i%3 == 0: move C to B
        if i%3 == 1: move A to B
        if i%3 == 2: move A to C
```

6. Git is a version control software that we will be using to submit all of our assignments for the semester. Git was designed for coordinating work among programmers; however, it can be used to track changes in files.

7. Tilde (~) is used to show a user's home directory while slash (‘/’) is used as the file separator symbol. Slash is also used to represent the root directory.

8. argc is short for “argument count”, and argv is short for “argument vector” and since it is an array of char* which are basically strings. We use arg count to make sure we don’t try to get information out of bounds in the argv array.