

### 11.4-3.


Consider an open-address hash table with uniform hashing. Give upper bounds on the expected number of probes in an unsuccessful search and on the expected number of probes in a successful search when the load factor is  $3/4$  and when it is  $7/8$ .

#### Answer.

If the load factor is  $3/4$ , the expected number of probes in a unsuccessful search is  $\frac{1}{1-3/4} = 4$ , while taking at most  $\frac{1}{3/4} \ln \frac{1}{1-3/4} < 1.849$  probes on average to search successfully.

If the load factor is  $7/8$ , the expected number of probes in a unsuccessful search is  $\frac{1}{1-7/8} = 8$ , while at most  $\frac{1}{7/8} \ln \frac{1}{1-7/8} < 2.377$  probes on average are required for a successful searching.

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