**PART 1**

**A.**

A hash function is used to map data of arbitrary size to data of a fixed size. The hash function is used to reduce the size of the data so that it can be stored in a data structure or transmitted over a network.

**B.**

A string hash function can be written as follows:

public int hash(String s) {

int h = 0;

for (int i = 0; i < s.length(); i++) {

h = h \* 31 + s.charAt(i);

}

return h;

}

**C.**

We might choose to use a hash function rather than search for a key because a hash function is faster than a linear search. A hash function can also be used to avoid collisions.

**D.**

The Java Util HashMap uses the following hash function for hashing strings:

public int hash(String s) {

int h = 0;

for (int i = 0; i < s.length(); i++) {

h = h \* 31 + s.charAt(i);

}

return h;

}