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Assorted Questions 3

Q: 3.4.5 Is the following implementation of hashCode() legal? public int hashCode() { return 17; } If so, describe the effect of using it. If not, explain why.

A: Yes, it would just require that every call to hashtable return the result 17.

Q: 3.4.6 Suppose that keys are t-bit integers. For a modular hash function with prime M, prove that each key bit has the property that there exist two keys differing only in that bit that have different hash values.

A: Keys are the t-bit Numbers, Hash function is having prime M, Each key bit holds the property of two keys which is different only on that bit. Hash functions are dependent on the KEY type, for each has function a different type can be used. Each of the keys is mainly differing only as specific kind of bits that is differing in the hash table size M that is 1/M, and it proves that the key bits will be having different hash values.

Q: 3.4.7 Consider the idea of implementing modular hashing for integer keys with the code (a \* k) % M , where a is an arbitrary fixed prime. Does this change mix up the bits sufficiently well that you can use nonprime M?

A:

|  |  |
| --- | --- |
| (3\*1)%10 | 3 |
| (3\*2)%10 | 6 |
| (3\*3)%10 | 9 |
| (3\*4)%10 | 2 |
| (3\*5)%10 | 5 |
| (3\*6)%10 | 8 |
| (3\*7)%10 | 1 |
| (3\*8)%10 | 4 |
| (3\*9)%10 | 7 |
| (3\*10)%10 | 0 |

In this example, using the modular function the bits are mixed up sufficiently.

Q: 4.1.1 What is the maximum number of edges in a graph with V vertices and no parallel edges? What is the minimum number of edges in a graph with V vertices, none of which are isolated?

A: Maximum: nC2 + n

Minimum: n -1

Q: 4.4.2 Provide an implementation of toString() for EdgeWeightedDigraph.

A: public String toString() {

StringBuilder s = new StringBuilder();

s.append(V + " " + E + NEWLINE);

for (int v = 0; v < V; v++) {

s.append(v + ": ");

for (DirectedEdge e : adj[v]) {

s.append(e + " ");

}

s.append(NEWLINE);

}

return s.toString();

}