Informatics II, Spring 2023, Solution 10

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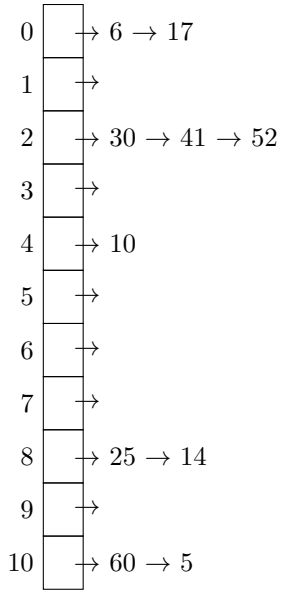
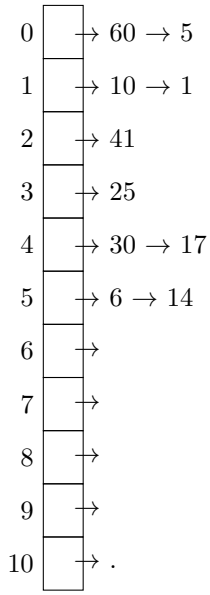
Task 1

(a)



(b)



Task 2

(a)

Slot	Value
0	52
1	5
2	
3	25
4	14
5	60
6	6
7	17
8	30
9	41
10	10

(b)

Slot	Value
0	15
1	52
2	
3	41
4	5
5	60
6	6
7	25
8	30
9	17
10	10

Task 3: Coding

(a)

```
# define m 7
```

(b)

```
void init(int A[]) {
  int i;
  for (i = 0; i < m; i++) {
    A[i] = 0;
  }
}
```

(c)

```
int h(int k, int i) {
  int h1 = (k % m) + 1;
  int h2 = (m - 1) - (k % (m - 1));
  return (int)(h1 + i * h2) % m;
}
```

(d)

```
void insert(int A[], int key) {
  int counter = 0;
  int hkey;
  do {
    hkey = h(key, counter);
  } while(A[hkey] != 0 && counter++ < m);
  A[hkey] = key;
}
```

(e)

```
int search(int A[], int key) {
  int counter = 0;
  int hkey;
  do {
    hkey = h(key, counter);
  } while(A[hkey] != key && A[hkey] != 0 && counter++ < m);
  if (A[hkey] == key) { return hkey; }
    else { return -1; }
  }
}
```

(f)

```
void printHash(int A[]) {
  int i;
  printf("Table␣size:␣%d\n", m);
  for (i = 0; i < m; i++) {
    if (A[i] != 0) {
      printf("i:␣%d\t␣key:␣%d\n", i, A[i]);
    }
  }
}
```

printHash:
Table size: 7
i: 0 key: 1315
i: 1 key: 2002
i: 2 key: 2001
i: 3 key: 2000
i: 5 key: 1313
i: 6 key: 1314

Task 4 [21 FS Final Exam]

```
int HTDelete(int k){
    int i=0;
    int probe = hash(k,i);
    int actualHashIdx= probe;
    while(i<m && HT[probe].status == 0 && HT[probe].key!=k){
        i++;
        probe = hash(k,i);
    }
    if(i>=m || HT[probe].status==-1) return -1;
    HT[probe].status = -1;
    HT[probe].key = -1;
    int j=(probe+1)%m;
    while(j!=actualHashIdx && HT[j].status!=-1){
        if(hash(HT[j].key,0)!=j){
            int tmpKey = HT[j].key;
            HT[j].key = -1;
            HT[j].status = -1;
            HTInsert(tmpKey);
        }
        j = (j+1)%m;
    }
    return probe;
}
```