CSE 373 /L-16/ 16.04.2024/

Huffman Running time analysis:

⇒ initiation of Q using BUZLD-HEAP ⇒ O(n)

⇒ EXTRACT-MIN, INSERT } O(lgn) on Q with (n-1) objects

$$\therefore T(n) = \sum_{i=1}^{n-1} \lg n$$

$$= O(n \lg n)$$

Coin Change Problem (Cashier's Problem)

Algorithm:

CASHIER (k, S) → k: amount need to change; S: List of coin

```
n = S.length
t = 0
for i = n downto 1
    while k >= S[i]
        t = t + 1
        k = k - S[i]
    if k = 0
        break
return t
```

* Does this algorithm always give the minimum amount of coins?

⇒ For common money systems, like euro, dollar

⇒ Yes

For a general coin set or Custom set

⇒ No

⇒

$S = 1, 5, 8, 10$

$K = 13$

From greedy algorithm ⇒ 4 coins ⇒ 10+1+1+1

But minimum coin is 2 ⇒ 8+5

* Run time:

for K = constant

$T(n) = O(n)$

Midterm

28 April