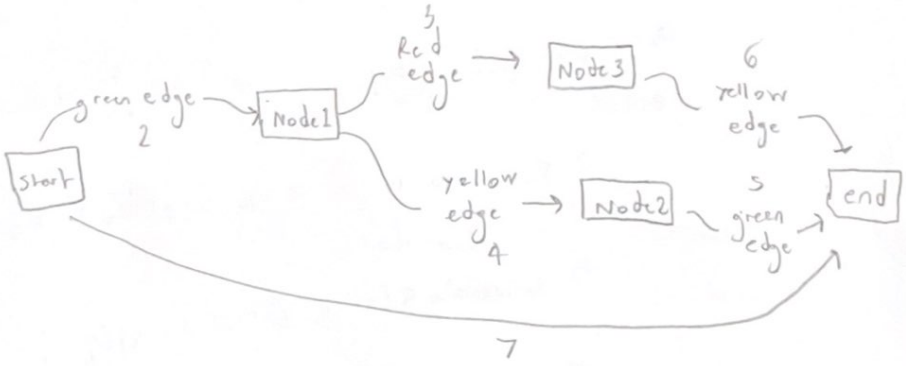
Mark Shinozaki

350 Homework 11



Problem 1: Enumerating the i-th shortest paths from initial to final node

→ Dijkstras algorithm or A* algorithm to find shortest path

→ Yen's, after finding the shortest path, Yen algo can be used to find the next k-1 shortest paths most efficiently

problem 2: Finding the shortest path without a Red edge followed by a yellow edge

→ Graph modification

- Remove any connection where red edge is directed followed by a yellow edge

→ Shortest path calculations

- Dijkstons algo to compute the shortest path from initial to final node

Problem 3

→ DFS/BFS with state memorization

→ Hosting color sequence

→ counting Unique Sequences

Problem 4

→ logarithmic transformations

→ Shortest path algo

5. what is private key?

→ RSA public key where $e = 49$, $n = 1053975\,0919$

→ Factorize n → Factorize n to find primes p and q

→ Calculate $\phi(n)$ → $\phi(n) = (p-1)(q-1)$

→ Calculate d → d is such that $(e \cdot d) \bmod \phi(n) = 1$

The prime factors of $n = 1053975\,0919$, $p = 43481$

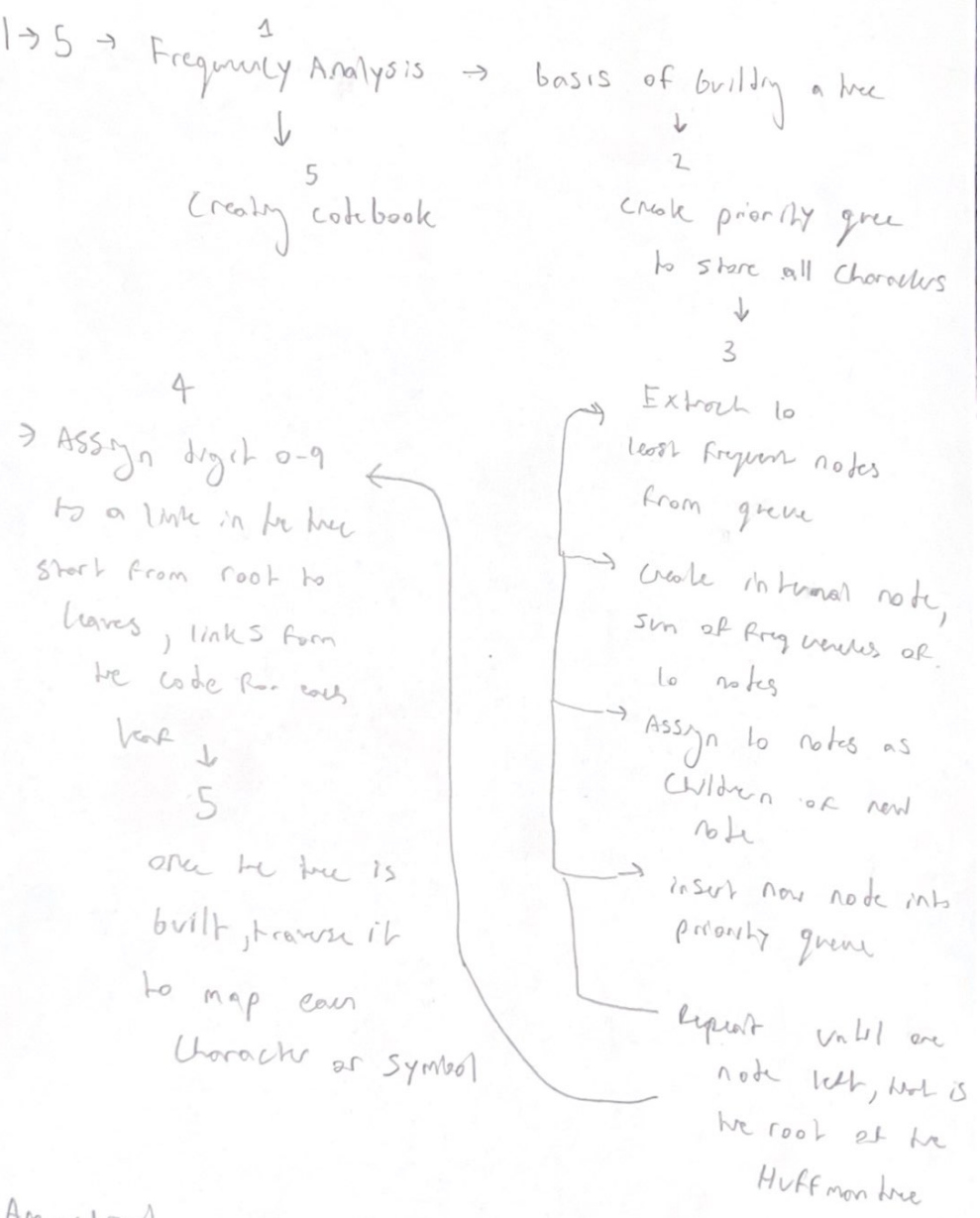
$q = 242399$

$\phi(n) = (p-1)(q-1)$

The private key exponent d. is modular multiplicative inverse of e modulo $\phi(n)$.

The value of $\phi(n)$ is $10,539,465,040$, the private key corresponding to the public key $e = 49$ $n = 1053975\,0919$ given by $d = 322636849$

6. Can you design a Huffman code algorithm?



7. Amortized analysis is a technique to assess the performance of an algorithm by averaging its resource consumption over a sequence of operations. This approach is useful because it considers both expensive and cheap operations, providing a balanced view over a worst case scenario. Tree are basic methods to perform amortized analysis, aggregate accounting and potential methods