1. What is Huffman coding primarily used for?

a) Data encryption

**b) Lossless data compression**

c) Lossy data compression

d) Image rendering

2. Below snippet shows the structure of which node?

struct MinHeapNode {

// One of the input characters

char data;

// Frequency of the character

unsigned freq;

// Left and right child of this node

struct MinHeapNode \*left, \*right;

};

1) Binary tree

2) AVL tree

**3) Huffman tree**

4) B tree

3. In Huffman coding, which type of characters are assigned shorter codes?

**a) Characters with higher frequencies**

b) Characters with lower frequencies

c) Characters with equal frequencies

d) Characters with varying lengths

4. What is the function of below code snippet?

int check(struct MinHeapNode\* root)

{

return !(root->left) && !(root->right);

}

a) check for root node

**b) check for leaf node**

c) check for node with maximum height

d) check for min node

5. What is the main goal of Huffman coding?

a) Maximizing the compression ratio

b) Minimizing the number of characters

**c) Minimizing the average code length**

d) Maximizing the encoded file size

6. What will be the output if we pass nodes as 3(left,freq-1),6(right,freq-2) to the below function?

bool operator()(MinHeapNode\* l, MinHeapNode\* r)

{

return (l->freq > r->freq);

}

a) true

**b) false**

c) compiler error

d) 1

7. Which data structure is commonly used to implement the priority queue in Huffman coding?

a) Stack

b) Queue

c) Binary search tree

**d) Min-heap**

8. What happens if the Huffman tree is not included when decoding a message?

**a) The message cannot be decoded**

b) The message will be decoded with errors

c) The message will be decoded with additional padding

d) The message will be decoded as plain text

9. In Huffman coding, how is the Huffman tree constructed?

**a) By using a greedy algorithm**

b) By employing a dynamic programming approach

c) By applying a divide and conquer strategy

d) By solving a system of linear equations

10. #include <iostream>

using namespace std;

int main() {

char encoded[] = "100101";

decodeHuffman(encoded);

return 0;

}

What will be the output of the program?

**a) Error: 'decodeHuffman' was not declared in this scope.**

b) A sequence of characters based on the decoded input.

c) 100101

d) Segmentation fault

11. What is the prefix property in the context of Huffman coding?

a) No two characters have the same frequency.

**b) No code is a prefix of another code.**

c) The most frequent character has the longest code.

d) The least frequent character has the shortest code.

12. What will be the decoded string in below code snippet?

map<char, string> huffmanTable;

huffmanTable['x'] = "01";

huffmanTable['y'] = "00";

huffmanTable['z'] = "10";

string encoded = "010100";

decodeHuffman(encoded, huffmanTable);

a) xyz

b) xzy

**c) xxy**

d) xxz

13. Which step of Huffman coding involves merging two nodes into a single node?

a) Selection of initial nodes

b) Assigning binary codes

**c) Constructing the Huffman tree**

d) Calculating frequencies

14. Which of the following statements about Huffman coding is true?

a) Huffman coding always results in lossless compression.

b) Huffman coding can only handle text data.

c) Huffman coding requires a fixed-length code for each character.

**d) Huffman coding is named after its inventor, David Huffman.**

15. What is the advantage of Huffman coding over fixed-length encoding?

**a) Higher compression ratio**

b) Simplicity of implementation

c) Faster encoding process

d) Better error detection

16. What is the time complexity of constructing a Huffman tree with n symbols?

a) O(n)

**b) O(n log n)**

c) O(n^2)

d) O(log n)

17. Which step is involved in decoding a Huffman-encoded message?

a) Constructing a frequency tree.

**b) Mapping codes to characters.**

c) Sorting characters based on frequencies.

d) Encrypting the message.

18. What is the purpose of adding a unique dummy node during Huffman tree construction?

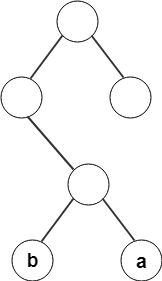
a) To improve compression efficiency.

b) To ensure that every character has a code.

**c) To make the tree balanced.**

d) To improve decoding speed.

19. From the following given tree, what is the code word for the character ‘a’?



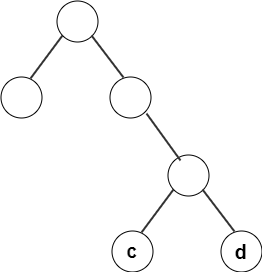
**a) 011**

b) 010

c) 100

d) 101

20. From the following given tree, what is the computed codeword for ‘c’?



a) 111

b) 101

**c) 110**

d) 011