TCS Prime Interview Preparation Cheat Sheet

1. Data Structures & Algorithms (DSA)

- Arrays, Strings, Linked Lists, Stacks, Queues
- Tree vs Binary Search Tree (BST)
- Sorting: Bubble, Selection, Insertion, Merge, Quick Sort
- Searching: Linear, Binary Search
- Recursion and Dynamic Programming basics

2. Sample Coding Problem: Find the Missing Number

Given an array of n distinct numbers from 0 to n, find the missing number.

Example:
Input: [3, 0, 1]
Output: 2

Java:
```java
int missingNumber(int[] nums) {
    int n = nums.length;
    int sum = n * (n + 1) / 2;
    for (int num : nums) sum -= num;
    return sum;
}
```

Python:
```python
def missingNumber(nums):
    n = len(nums)
    return n * (n + 1) // 2 - sum(nums)
```

C++:
```cpp
int missingNumber(vector<int>& nums) {
    int n = nums.size();
    int total = n * (n + 1) / 2;
    for (int num : nums) total -= num;
    return total;
}
```

3. Object-Oriented Programming (OOP)

- Principles: Abstraction, Encapsulation, Inheritance, Polymorphism
- Java: Interfaces vs Abstract classes, use of 'this' and 'super'
- Python: Use of classes and inheritance (superclass())
- C++: Virtual functions, constructors, destructors

4. SQL & DBMS

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- Types of Joins: INNER, LEFT, RIGHT, FULL
- Normalization: 1NF, 2NF, 3NF
- Important Queries:
  - Second Highest Salary:
    SELECT MAX(salary) FROM Employee WHERE salary < (SELECT MAX(salary) FROM Employee);
- Indexing, ACID properties

5. Operating System & Networking

- Process vs Thread, Deadlock, Memory Management
- TCP vs UDP, OSI & TCP/IP Model basics

6. Aptitude Puzzle Example

Q: You have 8 balls. One is heavier. Find the heavier one using only 2 weighings.

A: Divide into 3 groups (3+3+2). Compare two sets of 3. Then work with the heavier set.

7. HR Round Questions

1. Tell me about yourself.
2. Why TCS?
3. Describe a challenging situation/project.
4. Are you willing to relocate?
5. Strengths and Weaknesses

Sample Answer (Q1):
I'm a computer science graduate with a strong interest in problem-solving and software development.
I've worked on projects like a Student Leave Tracker app using Java and SQLite.
I'm passionate about creating real-world applications and recently cleared UGC NET 2024.
I'm now looking forward to applying my skills in a challenging role at TCS.