

General I/O Template

```
#include <stdio.h>
int main() {
    int var;

    while (scanf("%d", &var) == 1) {
        // Process input
    }

    return 0;
}
```

Non-Tail Recursive Example

The following implementation is not tail recursive because the multiplication operation occurs after the recursive call returns.

```
int factorial(unsigned int n) {
    if (n == 0) // Base case
        return 1;
    else
        return n * factorial(n - 1);
}
```

Tail Recursive Example (Accumulator)

The following implementation uses an accumulator to achieve tail recursion.

```
int fact_tail(unsigned int n, unsigned int acc) {
    if (n == 0)
        return acc;
    return fact_tail(n - 1, acc * n);
}

int factorial(unsigned int n) {
    return fact_tail(n, 1);
}
```

Recursion With Arrays

The following implementation calculates the number of ways to make change for a given amount using recursion with arrays.

```
int countWaysCoins(int coins[], int m, int amount) {
    if (amount == 0) {
        return 1;
    }

    if (amount < 0 || m <= 0) {
        return 0;
    }

    return countWaysCoins(coins, m - 1, amount) + // Exclude the last coin
           countWaysCoins(coins, m, amount - coins[m - 1]); // Use the last coin
}
```