EECS 348: Software Engineering Fall 2025

Lab 8: C Programming

Task 1. Football Score Possibilities

Given an integer representing a score in a National Football League (NFL) game, write a program to determine all possible combinations of scoring plays that can result in that score.

A scoring plays in an NFL game can be the following:

- Touchdown (TD) worth 6 points
- Field goal (FG) worth 3 points
- Safety worth 2 points
- Touchdown (TD) + 2-point conversion worth 8 points
- Touchdown (TD) + 1-point field goal worth 7 points

The program should repeatedly prompt the user to enter a score and terminate only when the user enters 1. For each score provided, the program should display all possible combinations of scoring plays that can produce that score.

Sample Input
Enter the NFL score (Enter 1 to stop): 25
Sample Output
Possible combinations of scoring plays if a team's score is 25:
0 TD + 2pt, 0 TD + FG, 0 TD, 1 3pt FG, 11 Safety
0 TD + 2pt, 0 TD + FG, 0 TD, 3 3pt FG, 8 Safety
0 TD + 2pt, 0 TD + FG, 0 TD, 5 3pt FG, 5 Safety
0 TD + 2pt, 0 TD + FG, 0 TD, 7 3pt FG, 2 Safety
0 TD + 2pt, 0 TD + FG, 1 TD, 1 3pt FG, 8 Safety
0 TD + 2pt, 0 TD + FG, 1 TD, 3 3pt FG, 5 Safety
0 TD + 2pt, 0 TD + FG, 1 TD, 5 3pt FG, 2 Safety
0 TD + 2pt, 0 TD + FG, 2 TD, 1 3pt FG, 5 Safety
0 TD + 2pt, 0 TD + FG, 2 TD, 3 3pt FG, 2 Safety
0 TD + 2pt, 0 TD + FG, 3 TD, 1 3pt FG, 2 Safety
0 TD + 2pt, 1 TD + FG, 0 TD, 0 3pt FG, 9 Safety
0 TD + 2pt, 1 TD + FG, 0 TD, 2 3pt FG, 6 Safety
0 TD + 2pt, 1 TD + FG, 0 TD, 4 3pt FG, 3 Safety
0 TD + 2pt, 1 TD + FG, 0 TD, 6 3pt FG, 0 Safety
0 TD + 2pt, 1 TD + FG, 1 TD, 0 3pt FG, 6 Safety
0 TD + 2pt, 1 TD + FG, 1 TD, 2 3pt FG, 3 Safety
0 TD + 2pt, 1 TD + FG, 1 TD, 4 3pt FG, 0 Safety

0 TD + 2pt, 1 TD + FG, 2 TD, 0 3pt FG, 3 Safety
0 TD + 2pt, 1 TD + FG, 2 TD, 2 3pt FG, 0 Safety
0 TD + 2pt, 1 TD + FG, 3 TD, 0 3pt FG, 0 Safety
0 TD + 2pt, 2 TD + FG, 0 TD, 1 3pt FG, 4 Safety
0 TD + 2pt, 2 TD + FG, 0 TD, 3 3pt FG, 1 Safety
0 TD + 2pt, 2 TD + FG, 1 TD, 1 3pt FG, 1 Safety
0 TD + 2pt, 3 TD + FG, 0 TD, 0 3pt FG, 2 Safety
1 TD + 2pt, 0 TD + FG, 0 TD, 1 3pt FG, 7 Safety
1 TD + 2pt, 0 TD + FG, 0 TD, 3 3pt FG, 4 Safety
1 TD + 2pt, 0 TD + FG, 0 TD, 5 3pt FG, 1 Safety
1 TD + 2pt, 0 TD + FG, 1 TD, 1 3pt FG, 4 Safety
1 TD + 2pt, 0 TD + FG, 1 TD, 3 3pt FG, 1 Safety
1 TD + 2pt, 0 TD + FG, 2 TD, 1 3pt FG, 1 Safety
1 TD + 2pt, 1 TD + FG, 0 TD, 0 3pt FG, 5 Safety
1 TD + 2pt, 1 TD + FG, 0 TD, 2 3pt FG, 2 Safety
1 TD + 2pt, 1 TD + FG, 1 TD, 0 3pt FG, 2 Safety
1 TD + 2pt, 2 TD + FG, 0 TD, 1 3pt FG, 0 Safety
2 TD + 2pt, 0 TD + FG, 0 TD, 1 3pt FG, 3 Safety
2 TD + 2pt, 0 TD + FG, 0 TD, 3 3pt FG, 0 Safety
2 TD + 2pt, 0 TD + FG, 1 TD, 1 3pt FG, 0 Safety
2 TD + 2pt, 1 TD + FG, 0 TD, 0 3pt FG, 1 Safety

Task 2. Temperature Conversion

Write a program in C that performs temperature conversions between Fahrenheit, Celsius, and Kelvin. The program will also categorize the temperature into predefined ranges based on its value and provide a weather advisory (e.g., "Freezing," "Comfortable," "Extreme Heat").

The program will prompt the user to:

- Enter the temperature value.
- Choose the temperature scale of the input value (Fahrenheit, Celsius, or Kelvin).
- Choose the conversion target (Fahrenheit, Celsius, or Kelvin).

The program will:

- Convert the temperature based on the user's input scale and desired target scale.
- Display the converted temperature.
- Categorize the converted temperature into one of the following categories:
  - Freezing: Below 0°C, [-∞, 0)

  - Cold: 0°C to 10°C, [0, 10)
  - Comfortable: 10°C to 25°C, [10, 25)
  - Hot: 25°C to 35°C, [20, 35)
  - Extreme Heat: Above 35°C, [35, ∞)
- Provide a simple weather advisory based on the category (e.g., "Wear a jacket," "Stay indoors").

Sample Input/Output
Enter the temperature value: 30
Enter the original scale (C, F, or K): C
Enter the scale to convert to (C, F, or K): F
Converted temperature: 86.00 F
Temperature category: Hot
Weather advisory: Drink lots of water!