Disclaimer: This code is provided for reference purposes and may require adjustments or validation for correctness in specific use cases.

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1. To find the average of 5 marks and calculate grade:

```c
#include <stdio.h>

int main() {
    int marks[5];
    float sum = 0.0, average;

    printf("Enter 5 marks: ");
    for (int i = 0; i < 5; i++) {
        scanf("%d", &marks[i]);
        sum += marks[i];
    }

    average = sum / 5.0;
    printf("Average marks = %.2f\n", average);

    // Calculate grade based on average marks
    if (average >= 90)
        printf("Grade: A\n");
    else if (average >= 80)
        printf("Grade: B\n");
    else if (average >= 70)
        printf("Grade: C\n");
    else if (average >= 60)
        printf("Grade: D\n");
    else if (average >= 40)
        printf("Grade: E\n");
    else
        printf("Grade: F\n");

    return 0;
}
```

2. To determine if input is vowel, consonant, or invalid:

```c
#include <stdio.h>
#include <ctype.h>

int main() {
    char input;

    printf("Enter a character: ");
    scanf(" %c", &input);

    if (isalpha(input)) {
        input = tolower(input);  // Convert to lowercase for easier
        if (input == 'a' || input == 'e' || input == 'i' || input =
            printf("Vowel\n");
        else
            printf("Consonant\n");
    } else {
        printf("Invalid input\n");
    }

    return 0;
}
```

3. Calculate profit or loss based on stock prices and quantity:

```c
#include <stdio.h>

int main() {
    float buy_price, sell_price, profit_or_loss;
    int quantity;

    printf("Enter buying price per stock: ");
    scanf("%f", &buy_price);

    printf("Enter selling price per stock: ");
    scanf("%f", &sell_price);

    printf("Enter quantity of stocks purchased: ");
```

```
    scanf("%d", &quantity);

    // Calculate profit or loss
    profit_or_loss = (sell_price - buy_price) * quantity;

    if (profit_or_loss > 0)
        printf("Profit: $%.2f\n", profit_or_loss);
    else if (profit_or_loss < 0)
        printf("Loss: $%.2f\n", -profit_or_loss);
    else
        printf("No profit or loss\n");

    return 0;
}
```

4. Find maximum and minimum of three numbers:

```
#include <stdio.h>

int main() {
    int a, b, c;

    printf("Enter three numbers: ");
    scanf("%d %d %d", &a, &b, &c);

    // Finding maximum
    int max = (a > b) ? ((a > c) ? a : c) : ((b > c) ? b : c);

    // Finding minimum
    int min = (a < b) ? ((a < c) ? a : c) : ((b < c) ? b : c);

    printf("Maximum: %d\n", max);
    printf("Minimum: %d\n", min);

    return 0;
}
```

5. Calculate savings and savings percentage:

```c
#include <stdio.h>

int main() {
    float salary, expenditure, savings, savings_percent;

    printf("Enter total salary: $");
    scanf("%f", &salary);

    printf("Enter total expenditure: $");
    scanf("%f", &expenditure);

    savings = salary - expenditure;
    savings_percent = (savings / salary) * 100;

    printf("Savings: $%.2f\n", savings);
    printf("Savings Percentage: %.2f%%\n", savings_percent);

    return 0;
}
```

6. Check if a number is odd or even:

```c
#include <stdio.h>

int main() {
    int number;

    printf("Enter a number: ");
    scanf("%d", &number);

    if (number % 2 == 0)
        printf("Even\n");
    else
        printf("Odd\n");

    return 0;
}
```

7. Count the number of digits of a number and determine if it's a 5-digit number:

```c
#include <stdio.h>
#include <stdlib.h>  // for abs() function

int main() {
    int number, digit_count = 0;

    printf("Enter a number: ");
    scanf("%d", &number);

    // Calculate number of digits (including '-' for negative numbe
    digit_count = (number == 0) ? 1 : (int)log10(abs(number)) + 1;

    if (digit_count == 5)
        printf("%d is a 5 digit number.\n", number);
    else
        printf("%d is not a 5 digit number.\n", number);

    return 0;
}
```

8. Calculate the cost of movie tickets based on different categories and apply discount if applicable:

```c
#include <stdio.h>

int main() {
    int children_count, adult_count, senior_count;
    float total_cost, discount_rate = 0.0, discounted_total;

    printf("Enter number of children tickets: ");
    scanf("%d", &children_count);

    printf("Enter number of adult tickets: ");
    scanf("%d", &adult_count);
```

```
    printf("Enter number of senior tickets: ");
    scanf("%d", &senior_count);

    // Calculate total cost based on ticket prices
    total_cost = children_count * 5.0 + adult_count * 7.0 + senior_

    printf("Total number of tickets: %d\n", children_count + adult_
    printf("Total cost: $%.2f\n", total_cost);

    // Apply discount if total number of tickets is more than 5
    if (children_count + adult_count + senior_count > 5) {
        discount_rate = 0.10;  // 10% discount
        discounted_total = total_cost * (1.0 - discount_rate);
        printf("Discounted Total Cost: $%.2f (10%% discount applied
    } else {
        printf("No discount applied.\n");
    }

    return 0;
}
```

9. Determine if a number is odd or even:

```
#include <stdio.h>

int main() {
    int number;

    printf("Enter a number: ");
    scanf("%d", &number);

    if (number % 2 == 0)
        printf("Even\n");
    else
        printf("Odd\n");

    return 0;
}
```

10. Determine if a character is a vowel, consonant, or special character:

```c
#include <stdio.h>
#include <ctype.h>

int main() {
    char character;

    printf("Enter a character: ");
    scanf("%c", &character);

    if (isalpha(character)) {
        character = tolower(character);
        if (character == 'a' || character == 'e' || character == 'i
            printf("Vowel\n");
        else
            printf("Consonant\n");
    } else {
        printf("Special character or invalid input\n");
    }

    return 0;
}
```

11. Calculate shipping cost based on product cost range:

```c
#include <stdio.h>

int main() {
    float product_cost, shipping_cost;

    printf("Enter the product cost: $");
    scanf("%f", &product_cost);

    if (product_cost >= 0 && product_cost <= 100)
        shipping_cost = 5.0;
    else if (product_cost > 100 && product_cost <= 500)
```

```
        shipping_cost = 10.0;
    else if (product_cost > 500 && product_cost <= 1000)
        shipping_cost = 15.0;
    else
        shipping_cost = 20.0;

    printf("Shipping cost: $%.2f\n", shipping_cost);

    return 0;
}
```

12. Determine if two numbers are even, odd, or neither:

```
#include <stdio.h>

int main() {
    int num1, num2;

    printf("Enter two numbers: ");
    scanf("%d %d", &num1, &num2);

    if (num1 % 2 == 0 && num2 % 2 == 0)
        printf("Both numbers are even.\n");
    else if (num1 % 2 != 0 && num2 % 2 != 0)
        printf("Both numbers are odd.\n");
    else
        printf("One number is even and the other is odd.\n");

    return 0;
}
```

13. Print the month name based on month number:

```
#include <stdio.h>

int main() {
    int month;
```

```c
    printf("Enter month number (1-12): ");
    scanf("%d", &month);

    switch (month) {
        case 1:
            printf("January\n");
            break;
        case 2:
            printf("February\n");
            break;
        case 3:
            printf("March\n");
            break;
        case 4:
            printf("April\n");
            break;
        case 5:
            printf("May\n");
            break;
        case 6:
            printf("June\n");
            break;
        case 7:
            printf("July\n");
            break;
        case 8:
            printf("August\n");
            break;
        case 9:
            printf("September\n");
            break;
        case 10:
            printf("October\n");
            break;
        case 11:
            printf("November\n");
            break;
        case 12:
            printf("December\n");
            break;
        default:
```

```
            printf("Invalid month number\n");
    }

    return 0;
}
```

14. Calculate bonus based on salary and gender:

```
#include <stdio.h>

int main() {
    float salary, bonus = 0.0;
    char gender;

    printf("Enter employee's salary: $");
    scanf("%f", &salary);

    printf("Enter employee's gender (M/F): ");
    scanf(" %c", &gender);

    if (gender == 'M' || gender == 'm') {
        bonus = salary * 0.05;  // 5% bonus for males
    } else if (gender == 'F' || gender == 'f') {
        bonus = salary * 0.10;  // 10% bonus for females
    }

    // Additional 2% bonus if salary is less than $10000
    if (salary < 10000) {
        bonus += salary * 0.02;
    }

    printf("Bonus amount: $%.2f\n", bonus);

    return 0;
}
```

15. Calculate compound interest:

```c
#include <stdio.h>
#include <math.h>

int main() {
    float principal, rate, time, compound_interest;

    printf("Enter principal amount: $");
    scanf("%f", &principal);

    printf("Enter annual interest rate (in percentage): ");
    scanf("%f", &rate);

    printf("Enter time period (in years): ");
    scanf("%f", &time);

    rate = rate / 100;  // Converting percentage to decimal

    // Calculating compound interest
    compound_interest = principal * pow(1 + rate, time) - principal

    printf("Compound interest: $%.2f\n", compound_interest);

    return 0;
}
```

16. Determine if a year is a leap year and calculate days in a month:

```c
#include <stdio.h>

int main() {
    int year, month, days;

    printf("Enter year: ");
    scanf("%d", &year);

    printf("Enter month (1-12): ");
    scanf("%d", &month);
```

```
    if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {
        // Leap year condition
        switch (month) {
            case 1: case 3: case 5: case 7: case 8: case 10: case 1
                days = 31;
                break;
            case 4: case 6: case 9: case 11:
                days = 30;
                break;
            case 2:
                days = 29;
                break;
            default:
                printf("Invalid month number\n");
                return 1;
        }
    } else {
        // Non-leap year condition
        switch (month) {
            case 1: case 3: case 5: case 7: case 8: case 10: case 1
                days = 31;
                break;
            case 4: case 6: case 9: case 11:
                days = 30;
                break;
            case 2:
                days = 28;
                break;
            default:
                printf("Invalid month number\n");
                return 1;
        }
    }

    printf("Number of days in month %d of year %d: %d\n", month, ye

    return 0;
}
```

17. Check if a given number is a 5-digit number:

```c
#include <stdio.h>
#include <stdlib.h>  // for abs() function

int main() {
    int number;

    printf

("Enter a number: ");
    scanf("%d", &number);

    if (abs(number) >= 10000 && abs(number) <= 99999)
        printf("%d is a 5-digit number\n", number);
    else
        printf("%d is not a 5-digit number\n", number);

    return 0;
}
```

18. Calculate the total salary, expenditure, savings, and savings percentage:

```c
#include <stdio.h>

int main() {
    float total_salary, total_expenditure, savings, savings_percent

    printf("Enter total salary: $");
    scanf("%f", &total_salary);

    printf("Enter total expenditure: $");
    scanf("%f", &total_expenditure);

    // Calculate savings
    savings = total_salary - total_expenditure;

    // Calculate savings percentage
    if (total_salary > 0) {
        savings_percentage = (savings / total_salary) * 100;
```

```
    } else {
        savings_percentage = 0.0;
    }

    printf("Total savings: $%.2f\n", savings);
    printf("Savings percentage: %.2f%%\n", savings_percentage);

    return 0;
}
```

19. Determine if a given number is odd or even and perform specific operations based on divisibility:

```
#include <stdio.h>

int main() {
    int number;

    printf("Enter a number: ");
    scanf("%d", &number);

    if (number % 3 == 0 && number % 5 == 0) {
        printf("Hello World!\n");
    } else if (number % 3 == 0) {
        printf("Hello\n");
    } else if (number % 5 == 0) {
        printf("World!\n");
    } else {
        printf("%d\n", number);
    }

    return 0;
}
```

20. Calculate the sum of odd and even numbers up to a given range:

```c
#include <stdio.h>

int main() {
    int start, end, num, sum_even = 0, sum_odd = 0;

    printf("Enter the start number: ");
    scanf("%d", &start);

    printf("Enter the end number: ");
    scanf("%d", &end);

    for (num = start; num <= end; num++) {
        if (num % 2 == 0) {
            sum_even += num;  // Add to even sum
        } else {
            sum_odd += num;  // Add to odd sum
        }
    }

    printf("Sum of even numbers: %d\n", sum_even);
    printf("Sum of odd numbers: %d\n", sum_odd);

    return 0;
}
```

21. Identify the profit or loss based on cost price and selling price:

```c
#include <stdio.h>

int main() {
    float cost_price, selling_price, profit_or_loss;

    printf("Enter cost price: $");
    scanf("%f", &cost_price);

    printf("Enter selling price: $");
    scanf("%f", &selling_price);

    profit_or_loss = selling_price - cost_price;
```

```c
    if (profit_or_loss > 0) {
        printf("Profit: $%.2f\n", profit_or_loss);
    } else if (profit_or_loss < 0) {
        printf("Loss: $%.2f\n", -profit_or_loss);  // Display loss
    } else {
        printf("No profit, no loss\n");
    }

    return 0;
}
```