PF-LAB-10-ASSIGNMENT

PROBLEM:1

```c
#include <stdio.h>
int sumOfDigits(int n) {
    if (n == 0)
        return 0;
    return (n % 10) + sumOfDigits(n / 10);
}
int main() {
    int num;
    printf("Enter a number: ");
    scanf("%d", &num);
    printf("Sum of digits: %d\n", sumOfDigits(num));
    return 0;
}
```

```
OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS    SEARCH ERROR

Microsoft Windows [Version 10.0.26100.2314]
(c) Microsoft Corporation. All rights reserved.

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 1.c -o 1.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>1.exe
Sum of digits: 6

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 1.c -o 1.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>1.exe
Enter a number: 1331
Sum of digits: 8

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>
```

PROBLEM:2

```c
C 2.c > ⦿ main()
1    #include <stdio.h>
2    #include <string.h>
3
4    void reverseString(char str[], int index, int size) {
5        if (index >= size / 2)
6            return;
7        char temp = str[index];
8        str[index] = str[size - index - 1];
9        str[size - index - 1] = temp;
10       reverseString(str, index + 1, size);
11   }
12   int main() {
13       char str[100];
14       printf("Enter a string: ");
15       scanf("%s", str);
16       int size = strlen(str);
17       reverseString(str, 0, size);
18       printf("Reversed string: %s\n", str);
19       return 0;
20   }
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 2.c -o 2.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>2.exe
Enter a string: hello
Reversed string: olleh

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>
```

PROBLEM:3

```c
#include <stdio.h>
#include <string.h>
typedef struct {
    int flightNumber;
    char departureCity[50];
    char destinationCity[50];
    char date[20];
    int availableSeats;
} Flight;
void displayFlightDetails(Flight flight) {
    printf("Flight Number: %d\n", flight.flightNumber);
    printf("Departure: %s\n", flight.departureCity);
    printf("Destination: %s\n", flight.destinationCity);
    printf("Date: %s\n", flight.date);
    printf("Available Seats: %d\n", flight.availableSeats);
}
void bookSeat(Flight *flight) {
    if (flight->availableSeats > 0) {
        flight->availableSeats--;
        printf("Seat booked successfully!\n");
    } else {
        printf("No seats available.\n");
    }
}
int main() {
    Flight flight;
    printf("Enter flight number: ");
    scanf("%d", &flight.flightNumber);
    printf("Enter departure city: ");
    scanf(" %[^\n]", flight.departureCity);
    printf("Enter destination city: ");
    scanf(" %[^\n]", flight.destinationCity);
    printf("Enter date (YYYY-MM-DD): ");
```

```c
33        printf("Enter date (YYYY-MM-DD): ");
34        scanf(" %[^\n]", flight.date);
35        printf("Enter available seats: ");
36        scanf("%d", &flight.availableSeats);
37        displayFlightDetails(flight);
38        char option;
39        printf("Do you want to book a seat? (y/n): ");
40        scanf(" %c", &option);
41        if (option == 'y') {
42            bookSeat(&flight);
43            displayFlightDetails(flight);
44        }
45        return 0;
46    }
47
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 3.c -o 3.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>3.exe
Enter flight number: 1232
Enter departure city: karachi
Enter destination city: lahore
Enter date (YYYY-MM-DD): 2024-12-04
Enter available seats: 4
Flight Number: 1232
Departure: karachi
Destination: lahore
Date: 2024-12-04
Available Seats: 4
Do you want to book a seat? (y/n): y
Seat booked successfully!
Flight Number: 1232
Departure: karachi
Destination: lahore
Date: 2024-12-04
Available Seats: 3

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>
```

PROBLEM:4

```c
#include <stdio.h>
#include <string.h>
typedef struct {
    char title[50];
    char genre[20];
    char director[50];
    int releaseYear;
    float rating;
} Movie;
void addMovie(Movie movies[], int *count) {
    printf("Enter title: ");
    scanf(" %[^\n]", movies[*count].title);
    printf("Enter genre: ");
    scanf(" %[^\n]", movies[*count].genre);
    printf("Enter director: ");
    scanf(" %[^\n]", movies[*count].director);
    printf("Enter release year: ");
    scanf("%d", &movies[*count].releaseYear);
    printf("Enter rating: ");
    scanf("%f", &movies[*count].rating);
    (*count)++;
}
void searchByGenre(Movie movies[], int count, char genre[]) {
    int found = 0;
    for (int i = 0; i < count; i++) {
        if (strcmp(movies[i].genre, genre) == 0) {
            printf("Title: %s, Director: %s, Year: %d, Rating: %.1f\n",
                    movies[i].title, movies[i].director, movies[i].releaseYear, movies[i].rating);
            found = 1;
        }
    }
    if (!found)
        printf("No movies found for the genre '%s'.\n", genre);
}
```

```c
void displayAllMovies(Movie movies[], int count) {
    for (int i = 0; i < count; i++) {
        printf("Title: %s, Genre: %s, Director: %s, Year: %d, Rating: %.1f\n",
                movies[i].title, movies[i].genre, movies[i].director, movies[i].releaseYear, movies[i].rating);
    }
}
int main() {
    Movie movies[100];
    int count = 0, option;
    char genre[20];
    while (1) {
        printf("\n1. Add Movie\n2. Search by Genre\n3. Display All Movies\n4. Exit\nEnter choice: ");
        scanf("%d", &option);
        switch (option) {
        case 1:
            addMovie(movies, &count);
            break;
        case 2:
            printf("Enter genre to search: ");
            scanf(" %[^\n]", genre);
            searchByGenre(movies, count, genre);
            break;
        case 3:
            displayAllMovies(movies, count);
            break;
        case 4:
            return 0;
        default:
            printf("Invalid choice. Try again.\n");
        }
    }
}
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 4.c -o 4.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>4.exe

1. Add Movie
2. Search by Genre
3. Display All Movies
4. Exit
Enter choice: 1
Enter title: ABC
Enter genre: ACTION
Enter director: ADAM
Enter release year: 2023
Enter rating: 9.4

1. Add Movie
2. Search by Genre
3. Display All Movies
4. Exit
Enter title: ABC
Enter genre: ACTION
Enter director: ADAM
Enter release year: 2023
Enter rating: 9.4

1. Add Movie
2. Search by Genre
3. Display All Movies
4. Exit
Enter choice: 3
Title: ABC, Genre: ACTION, Director: ADAM, Year: 2023, Rating: 9.4
```

PROBLEM:5

```c
#include <stdio.h>
void printArray(int arr[], int size, int index) {
    if (index == size)
        return;
    printf("%d ", arr[index]);
    printArray(arr, size, index + 1);
}
int main() {
    int size;
    printf("Enter the size of the array: ");
    scanf("%d", &size);
    int arr[size];
    printf("Enter %d elements: ", size);
    for (int i = 0; i < size; i++) {
        scanf("%d", &arr[i]);
    }
    printf("Array elements: ");
    printArray(arr, size, 0);
    printf("\n");
    return 0;
}
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 5-.c -o 5-.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>5-.exe
Enter the size of the array: 3
Enter 3 elements: apple
Array elements: 4199703 4214918 6422272

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>
```

PROBLEM:6

```c
#include <stdio.h>
#include <math.h>
typedef struct {
    float x, y;
} Point;
float calculateDistance(Point p1, Point p2) {
    return sqrt((p2.x - p1.x) * (p2.x - p1.x) + (p2.y - p1.y) * (p2.y - p1.y));
}
int isPointInRectangle(Point p, Point bottomLeft, Point topRight) {
    return p.x >= bottomLeft.x && p.x <= topRight.x && p.y >= bottomLeft.y && p.y <= topRight.y;
}
int main() {
    Point p1, p2, bottomLeft, topRight, testPoint;
    printf("Enter coordinates of Point 1 (x y): ");
    scanf("%f %f", &p1.x, &p1.y);
    printf("Enter coordinates of Point 2 (x y): ");
    scanf("%f %f", &p2.x, &p2.y);
    printf("Distance between points: %.2f\n", calculateDistance(p1, p2));
    printf("Enter bottom-left coordinates of rectangle (x y): ");
    scanf("%f %f", &bottomLeft.x, &bottomLeft.y);
    printf("Enter top-right coordinates of rectangle (x y): ");
    scanf("%f %f", &topRight.x, &topRight.y);
    printf("Enter test point coordinates (x y): ");
    scanf("%f %f", &testPoint.x, &testPoint.y);
    if (isPointInRectangle(testPoint, bottomLeft, topRight))
        printf("The point lies within the rectangle.\n");
    else
        printf("The point is outside the rectangle.\n");
    return 0;
}
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 6.c -o 6.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>6.exe
Enter coordinates of Point 1 (x y): 4
3
Enter coordinates of Point 2 (x y): 4
8
Distance between points: 5.00
Enter bottom-left coordinates of rectangle (x y):
```

PROBLEM:7

```c
C  7.c  main()
1    #include <stdio.h>
2    #define MAX_TEMP 35.0
3    void checkTemperature(float temp) {
4        static int exceedCount = 0;
5        if (temp > MAX_TEMP) {
6            exceedCount++;
7            printf("Temperature %.2f exceeds the limit! Count: %d\n", temp, exceedCount);
8        } else {
9            printf("Temperature %.2f is within the limit.\n", temp);
10       }
11   }
12   int main() {
13       int n;
14       printf("Enter the number of temperature readings: ");
15       scanf("%d", &n);
16       float temperatures[n];
17       printf("Enter %d temperature readings: ", n);
18       for (int i = 0; i < n; i++) {
19           scanf("%f", &temperatures[i]);
20       }
21       for (int i = 0; i < n; i++) {
22           checkTemperature(temperatures[i]);
23       }
24       return 0;
25   }
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 7.c -o 7.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>7.exe
Enter the number of temperature readings: 3
Enter 3 temperature readings: 45
32
46
Temperature 45.00 exceeds the limit! Count: 1
Temperature 32.00 is within the limit.
Temperature 46.00 exceeds the limit! Count: 2

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>
```

PROBLEM:8

```c
#include <stdio.h>
#include <string.h>
typedef struct {
    char make[30];
    char model[30];
    int year;
    float price;
    float mileage;
} Car;
void addCar(Car cars[], int *count) {
    printf("Enter make: ");
    scanf(" %[^\n]", cars[*count].make);
    printf("Enter model: ");
    scanf(" %[^\n]", cars[*count].model);
    printf("Enter year: ");
    scanf("%d", &cars[*count].year);
    printf("Enter price: ");
    scanf("%f", &cars[*count].price);
    printf("Enter mileage: ");
    scanf("%f", &cars[*count].mileage);
    (*count)++;
}
void searchCarByMakeOrModel(Car cars[], int count, char query[]) {
    int found = 0;
    for (int i = 0; i < count; i++) {
        if (strcmp(cars[i].make, query) == 0 || strcmp(cars[i].model, query) == 0) {
            printf("Make: %s, Model: %s, Year: %d, Price: %.2f, Mileage: %.2f\n",
                   cars[i].make, cars[i].model, cars[i].year, cars[i].price, cars[i].mileage);
            found = 1;
        }
    }
    if (!found)
        printf("No cars found matching '%s'.\n", query);
}
```

```c
35    void displayAllCars(Car cars[], int count) {
36        for (int i = 0; i < count; i++) {
37            printf("Make: %s, Model: %s, Year: %d, Price: %.2f, Mileage: %.2f\n",
38                    cars[i].make, cars[i].model, cars[i].year, cars[i].price, cars[i].mileage);
39        }
40    }
41    int main() {
42        Car cars[100];
43        int count = 0, option;
44        char query[30];
45        while (1) {
46            printf("\n1. Add Car\n2. Search by Make or Model\n3. Display All Cars\n4. Exit\nEnter choice: ");
47            scanf("%d", &option);
48            switch (option) {
49            case 1:
50                addCar(cars, &count);
51                break;
52            case 2:
53                printf("Enter make or model to search: ");
54                scanf(" %[^\n]", query);
55                searchCarByMakeOrModel(cars, count, query);
56                break;
57            case 3:
58                displayAllCars(cars, count);
59                break;
60            case 4:
61                return 0;
62            default:
63                printf("Invalid choice. Try again.\n");
64            }
65        }
66    }
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 8.c -o 8.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>8.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>8.exe
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>8.exe

1. Add Car
2. Search by Make or Model
2. Search by Make or Model
3. Display All Cars
4. Exit
Enter choice: █
```

PROBLEM:9

```c
#include <stdio.h>
void bubbleSortRecursive(int arr[], int size) {
    if (size == 1)
        return;

    for (int i = 0; i < size - 1; i++) {
        if (arr[i] > arr[i + 1]) {
            int temp = arr[i];
            arr[i] = arr[i + 1];
            arr[i + 1] = temp;
        }
    }
    bubbleSortRecursive(arr, size - 1);
}
int main() {
    int size;
    printf("Enter the size of the array: ");
    scanf("%d", &size);
    int arr[size];
    printf("Enter %d elements: ", size);
    for (int i = 0; i < size; i++) {
        scanf("%d", &arr[i]);
    }
    bubbleSortRecursive(arr, size);
    printf("Sorted array: ");
    for (int i = 0; i < size; i++) {
        printf("%d ", arr[i]);
    }
    printf("\n");
    return 0;
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 9.c  -o 9.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>9.exe
Enter the size of the array: 3
Enter 3 elements: big
Sorted array: 16 4199814 4214914
```

PROBLEM:10

```c
#include <stdio.h>
#include <string.h>
typedef struct {
    char packageName[50];
    char destination[50];
    int duration;
    float cost;
    int seatsAvailable;
} Package;
void bookPackage(Package *pkg) {
    if (pkg->seatsAvailable > 0) {
        pkg->seatsAvailable--;
        printf("Booking successful! Seats left: %d\n", pkg->seatsAvailable);
    } else {
        printf("No seats available for this package.\n");
    }
}
void displayPackages(Package packages[], int count) {
    for (int i = 0; i < count; i++) {
        printf("Package: %s, Destination: %s, Duration: %d days, Cost: %.2f, Seats: %d\n",
                packages[i].packageName, packages[i].destination, packages[i].duration,
                packages[i].cost, packages[i].seatsAvailable);
    }
}
int main() {
    Package packages[100];
    int count = 0, option;
    while (1) {
        printf("\n1. Add Package\n2. Book Package\n3. Display Packages\n4. Exit\nEnter choice: ");
        scanf("%d", &option);
        switch (option) {
        case 1:
            printf("Enter package name: ");
            scanf(" %[^\n]", packages[count].packageName);
```

```c
            printf("Enter destination: ");
            scanf(" %[^\n]", packages[count].destination);
            printf("Enter duration (in days): ");
            scanf("%d", &packages[count].duration);
            printf("Enter cost: ");
            scanf("%f", &packages[count].cost);
            printf("Enter seats available: ");
            scanf("%d", &packages[count].seatsAvailable);
            count++;
            break;
        case 2:
            printf("Enter package number to book (1 to %d): ", count);
            int packageNumber;
            scanf("%d", &packageNumber);
            if (packageNumber > 0 && packageNumber <= count) {
                bookPackage(&packages[packageNumber - 1]);
            } else {
                printf("Invalid package number.\n");
            }
            break;
        case 3:
            displayPackages(packages, count);
            break;
        case 4:
            return 0;
        default:
            printf("Invalid choice. Try again.\n");
        }
    }
}
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 10.c  -o 10.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>10.exe

1. Add Package
2. Book Package
3. Display Packages
4. Exit
Enter choice:
```

PROBLEM:11

```c
#include <stdio.h>
#define METER_TO_KILOMETER 0.001
float convertToKilometers(float meters) {
    static int callCount = 0;
    callCount++;
    printf("Function called %d times.\n", callCount);
    return meters * METER_TO_KILOMETER;
}
int main() {
    int n;
    printf("Enter the number of distances: ");
    scanf("%d", &n);
    float meters;
    for (int i = 0; i < n; i++) {
        printf("Enter distance in meters: ");
        scanf("%f", &meters);
        printf("Distance in kilometers: %.3f km\n", convertToKilometers(meters));
    }
    return 0;
}
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 11.c -o 11.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>11.exe
Enter the number of distances: 2
Enter distance in meters: 12
Function called 1 times.
Distance in kilometers: 0.012 km
Enter distance in meters:
```

PROBLEM:12

```c
#include <stdio.h>
int linearSearch(int arr[], int size, int target, int index) {
    if (index == size)
        return -1;
    if (arr[index] == target)
        return index;
    return linearSearch(arr, size, target, index + 1);
}
int main() {
    int size, target;
    printf("Enter the size of the array: ");
    scanf("%d", &size);
    int arr[size];
    printf("Enter %d elements: ", size);
    for (int i = 0; i < size; i++) {
        scanf("%d", &arr[i]);
    }
    printf("Enter the target element to search: ");
    scanf("%d", &target);
    int result = linearSearch(arr, size, target, 0);
    if (result == -1)
        printf("Element %d not found in the array.\n", target);
    else
        printf("Element %d found at index %d.\n", target, result);
    return 0;
}
```

```
D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>gcc 12.c -o 12.exe

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>12.exe
Enter the size of the array: 3
Enter 3 elements: adk ads adfe
Enter the target element to search: Element -2 not found in the array.

D:\MY ASSIGNMENTS\PF-LAB-ASSIGNMENT\LAB-10>
```