Program 1. Implementation of symbol table.

```
#include <stdio.h>
#include <string.h>
#include <stdlib.h>

#define MAX 100 // Maximum size of the symbol table

// Structure to represent a symbol
struct Symbol {
  char name[50];   // Name of the identifier
  char type[20];   // Data type (e.g., int, float, char)
  int size;        // Size of the identifier
  int address;     // Memory address
};

// Global symbol table
struct Symbol symbolTable[MAX];
int count = 0; // Counter for the number of symbols in the table

// Function to insert a symbol into the table
void insertSymbol(char name[], char type[], int size, int address) {
  for (int i = 0; i < count; i++) {
    if (strcmp(symbolTable[i].name, name) == 0) {
      printf("Error: Symbol '%s' already exists in the table.\n", name);
      return;
    }
  }

  if (count >= MAX) {
    printf("Error: Symbol table is full.\n");
    return;
  }

  strcpy(symbolTable[count].name, name);
  strcpy(symbolTable[count].type, type);
  symbolTable[count].size = size;
  symbolTable[count].address = address;
  count++;

  printf("Symbol '%s' inserted successfully.\n", name);
}

// Function to search for a symbol in the table
void searchSymbol(char name[]) {
  for (int i = 0; i < count; i++) {
    if (strcmp(symbolTable[i].name, name) == 0) {
      printf("Symbol found:\n");
```

```
Symbol Table Operations:
1. Insert Symbol
2. Search Symbol
3. Display Symbol Table
4. Exit
Enter your choice: 1
Enter name: v2
Enter type: float
Enter size: 4
Enter address: 10010
Symbol 'v2' inserted successfully.

Symbol Table Operations:
1. Insert Symbol
2. Search Symbol
3. Display Symbol Table
4. Exit
Enter your choice: 1
Enter name: v3
Enter type: double
Enter size: 8
Enter address: 10020
Symbol 'v3' inserted successfully.

Symbol Table Operations:
1. Insert Symbol
2. Search Symbol
3. Display Symbol Table
4. Exit
Enter your choice: 2
Enter name to search: v2
Symbol found:
Name: v2
Type: float
Size: 4
Address: 10010

Symbol Table Operations:
1. Insert Symbol
2. Search Symbol
3. Display Symbol Table
4. Exit
Enter your choice: 3

Symbol Table:
-----------------------------------
| Name   | Type   | Size | Address |
-----------------------------------
| v1     | int    | 2    | 10000   |
| v2     | float  | 4    | 10010   |
| v3     | double | 8    | 10020   |
-----------------------------------
```

```
            printf("Enter name: ");
            scanf("%s", name);
            printf("Enter type: ");
            scanf("%s", type);
            printf("Enter size: ");
            scanf("%d", &size);
            printf("Enter address: ");
            scanf("%d", &address);
            insertSymbol(name, type, size, address);
            break;

        case 2:
            printf("Enter name to search: ");
            scanf("%s", name);
            searchSymbol(name);
            break;

        case 3:
            displaySymbolTable();
            break;

        case 4:
            printf("Exiting program.\n");
            exit(0);

        default:
            printf("Invalid choice. Please try again.\n");
        }
    }

    return 0;
}
```

Output:

```
D:\Compiler Design> gcc SymbolTable.c

D:\Compiler Design> a.exe

Symbol Table Operations:
1. Insert Symbol
2. Search Symbol
3. Display Symbol Table
4. Exit
Enter your choice: 1
Enter name: v1
Enter type: int
Enter size: 2
Enter address: 10000
Symbol 'v1' inserted successfully.
```

```
            printf("Name: %s\n", symbolTable[i].name);
            printf("Type: %s\n", symbolTable[i].type);
            printf("Size: %d\n", symbolTable[i].size);
            printf("Address: %d\n", symbolTable[i].address);
            return;
        }
    }
    printf("Symbol '%s' not found in the table.\n", name);
}

// Function to display the symbol table
void displaySymbolTable() {
    if (count == 0) {
        printf("Symbol table is empty.\n");
        return;
    }

    printf("\nSymbol Table:\n");
    printf("-----------------------------------------\n");
    printf("| %-10s | %-10s | %-5s | %-10s |\n", "Name", "Type", "Size", "Address");
    printf("-----------------------------------------\n");

    for (int i = 0; i < count; i++) {
        printf("| %-10s | %-10s | %-5d | %-10d |\n",
               symbolTable[i].name,
               symbolTable[i].type,
               symbolTable[i].size,
               symbolTable[i].address);
    }

    printf("-----------------------------------------\n");
}

int main() {
    int choice;
    char name[50], type[20];
    int size, address;

    while (1) {
        printf("\nSymbol Table Operations:\n");
        printf("1. Insert Symbol\n");
        printf("2. Search Symbol\n");
        printf("3. Display Symbol Table\n");
        printf("4. Exit\n");
        printf("Enter your choice: ");
        scanf("%d", &choice);

        switch (choice) {
            case 1:
```