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**35. Consider a file system that brings all the file pointers together into an index block. The *i*th entry in the index block points to the *i*th block of the file. Design a C program to simulate the file allocation strategy.**

### **AIM**

To design a C program that simulates a **File Allocation Strategy** using an **Index Block**, where all the file pointers are brought together into an index block, and each entry in the index block points to the respective block of the file.

### **ALGORITHM**

- 1. Start**
2. Define a structure FileBlock to represent a block in the file.
3. Create an array indexBlock[] to represent the index block that holds pointers to file blocks.
4. Create a function to add a new record to the file and update the index block accordingly.
5. Create a function to display the current file blocks and index block.
6. Create a function to access a specific file block using the index block.
- 7. Stop**

### **PROCEDURE**

1. Include necessary libraries (stdio.h for input/output, stdlib.h for dynamic memory management).
2. Define a structure FileBlock to represent each file block (with data).
3. Define an array indexBlock[] to simulate the index block storing pointers to file blocks.
4. Implement functions to add new file blocks (addFileBlock()), display file blocks (displayFile()), and access specific blocks (accessFileBlock()).
5. Initialize the file system and perform operations such as adding file blocks, displaying file contents, and accessing blocks using the index.
- 6. End**

CODE:

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

```
#define MAX_BLOCKS 10
```

```
typedef struct {
    char data[100];
} FileBlock;
```

```
FileBlock file[MAX_BLOCKS];
int indexBlock[MAX_BLOCKS];
```

```

int blockCount = 0;

void addFileBlock(const char *data) {
    if (blockCount < MAX_BLOCKS) {
        snprintf(file[blockCount].data, sizeof(file[blockCount].data), "%s", data);
        indexBlock[blockCount] = blockCount;
        blockCount++;
    } else {
        printf("File system is full. Cannot add more blocks.\n");
    }
}

void displayFile() {
    if (blockCount == 0) {
        printf("No blocks in the file.\n");
        return;
    }

    printf("Index Block: ");
    for (int i = 0; i < blockCount; i++) {
        printf("%d ", indexBlock[i]);
    }
    printf("\n");

    printf("File Blocks:\n");
    for (int i = 0; i < blockCount; i++) {
        printf("Block %d: %s\n", indexBlock[i], file[indexBlock[i]].data);
    }
}

void accessFileBlock(int blockNum) {
    if (blockNum >= 0 && blockNum < blockCount) {
        printf("Accessing Block %d: %s\n", indexBlock[blockNum],
file[indexBlock[blockNum]].data);
    } else {
        printf("Invalid block number.\n");
    }
}

int main() {
    int choice, blockNum;
    char data[100];

    while (1) {
        printf("\nFile Allocation System (Index Block)\n");
        printf("1. Add File Block\n");
    }
}

```

```

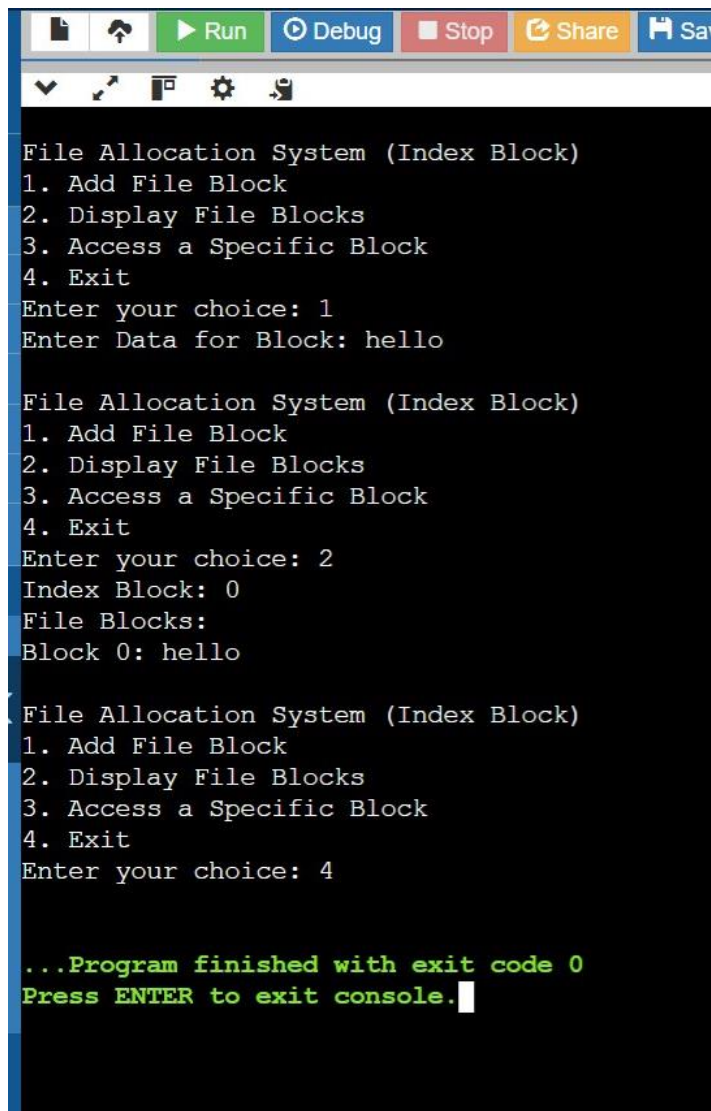
printf("2. Display File Blocks\n");
printf("3. Access a Specific Block\n");
printf("4. Exit\n");
printf("Enter your choice: ");
scanf("%d", &choice);
getchar();

switch (choice) {
    case 1:
        printf("Enter Data for Block: ");
        fgets(data, sizeof(data), stdin);
        data[strcspn(data, "\n")] = 0;
        addFileBlock(data);
        break;
    case 2:
        displayFile();
        break;
    case 3:
        printf("Enter Block Number to Access: ");
        scanf("%d", &blockNum);
        accessFileBlock(blockNum);
        break;
    case 4:
        exit(0);
    default:
        printf("Invalid choice. Please try again.\n");
}
}

return 0;
}

```

OUTPUT:



The image shows a code editor window with a dark background. At the top, there is a toolbar with buttons for 'Run' (green), 'Debug' (blue), 'Stop' (red), 'Share' (orange), and 'Save' (blue). Below the toolbar, there is a menu bar with icons for file operations. The main area of the editor displays a text-based menu for a 'File Allocation System (Index Block)'. The menu options are: 1. Add File Block, 2. Display File Blocks, 3. Access a Specific Block, and 4. Exit. The user has entered '1' for the first option, and the program has prompted for 'Data for Block: hello'. The user has then entered '2' for the second option, and the program has displayed 'Index Block: 0' and 'File Blocks: Block 0: hello'. The user has then entered '4' for the fourth option, and the program has finished with exit code 0. The text is displayed in a monospaced font, with the final status message in green.

```
File Allocation System (Index Block)
1. Add File Block
2. Display File Blocks
3. Access a Specific Block
4. Exit
Enter your choice: 1
Enter Data for Block: hello

File Allocation System (Index Block)
1. Add File Block
2. Display File Blocks
3. Access a Specific Block
4. Exit
Enter your choice: 2
Index Block: 0
File Blocks:
Block 0: hello

File Allocation System (Index Block)
1. Add File Block
2. Display File Blocks
3. Access a Specific Block
4. Exit
Enter your choice: 4

...Program finished with exit code 0
Press ENTER to exit console.
```