

```

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

#define MAX_BLOCKS 10
#define MAX_FILES 5
#define MAX_FILE_NAME 20

int disk[MAX_BLOCKS];

typedef struct {
    char name[MAX_FILE_NAME];
    int start_block;
    int size;
} SequentialFile;

typedef struct {
    char name[MAX_FILE_NAME];
    int index_blocks[MAX_BLOCKS];
    int num_blocks;
} IndexedFile;

typedef struct Node {
    int block;
    struct Node *next;
} LinkedNode;

typedef struct {
    char name[MAX_FILE_NAME];
    LinkedNode *head;
} LinkedFile;

void initialize_disk() {
    for (int i = 0; i < MAX_BLOCKS; i++) {
        disk[i] = 0;
    }
}

void print_disk() {
    printf("Disk blocks: ");
    for (int i = 0; i < MAX_BLOCKS; i++) {
        printf("%d ", disk[i]);
    }
    printf("\n");
}

void allocate_sequential(SequentialFile *file, int start_block, int size) {
    if (start_block + size > MAX_BLOCKS) {
        printf("Error: Not enough space on the disk.\n");
        return;
    }
    for (int i = start_block; i < start_block + size; i++) {
        if (disk[i] != 0) {
            printf("Error: Space already allocated.\n");
            return;
        }
    }
    file->start_block = start_block;
    file->size = size;
    strcpy(file->name, "SequentialFile");
    for (int i = start_block; i < start_block + size; i++) {
        disk[i] = 1;
    }
    printf("Sequential file '%s' allocated from block %d to %d.\n", file->name,
        start_block, start_block + size - 1);
}

void allocate_indexed(IndexedFile *file, int blocks[], int num_blocks) {
    if (num_blocks > MAX_BLOCKS) {
        printf("Error: Too many blocks requested.\n");
        return;
    }
    for (int i = 0; i < num_blocks; i++) {
        if (blocks[i] >= MAX_BLOCKS || disk[blocks[i]] != 0) {
            printf("Error: Block %d is not available.\n", blocks[i]);
            return;
        }
    }
}

```

```

    }
}
file->num_blocks = num_blocks;
strcpy(file->name, "IndexedFile");
for (int i = 0; i < num_blocks; i++) {
    disk[blocks[i]] = 1; // Mark block as allocated
    file->index_blocks[i] = blocks[i];
}
printf("Indexed file '%s' allocated at blocks: ", file->name);
for (int i = 0; i < num_blocks; i++) {
    printf("%d ", file->index_blocks[i]);
}
printf("\n");
}

void allocate_linked(LinkedFile *file, int blocks[], int num_blocks) {
    ListNode *prev = NULL;
    ListNode *head = NULL;
    for (int i = 0; i < num_blocks; i++) {
        if (blocks[i] >= MAX_BLOCKS || disk[blocks[i]] != 0) {
            printf("Error: Block %d is not available.\n", blocks[i]);
            while (head != NULL) {
                ListNode *temp = head;
                head = head->next;
                free(temp);
            }
            return;
        }
        disk[blocks[i]] = 1;
        ListNode *node = (ListNode *)malloc(sizeof(ListNode));
        node->block = blocks[i];
        node->next = NULL;
        if (prev == NULL) {
            head = node;
        } else {
            prev->next = node;
        }
        prev = node;
    }
    file->head = head;
    strcpy(file->name, "LinkedFile");
    printf("Linked file '%s' allocated with blocks: ", file->name);
    ListNode *current = head;
    while (current != NULL) {
        printf("%d ", current->block);
        current = current->next;
    }
    printf("\n");
}

int main() {
    initialize_disk();
    print_disk();

    SequentialFile seq_file;
    int start_block = 2;
    int size = 4;
    allocate_sequential(&seq_file, start_block, size);
    print_disk();

    IndexedFile idx_file;
    int index_blocks[] = {6, 7, 8};
    allocate_indexed(&idx_file, index_blocks, 3);
    print_disk();

    LinkedFile lnk_file;
    int linked_blocks[] = {1, 3, 5};
    allocate_linked(&lnk_file, linked_blocks, 3);
    print_disk();

    return 0;
}

```