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LAB 14

QUESTION: Write a C program to simulate the following file allocation strategies.

a)Sequential b) Indexed c) Linked

ANSWER:

CODE:

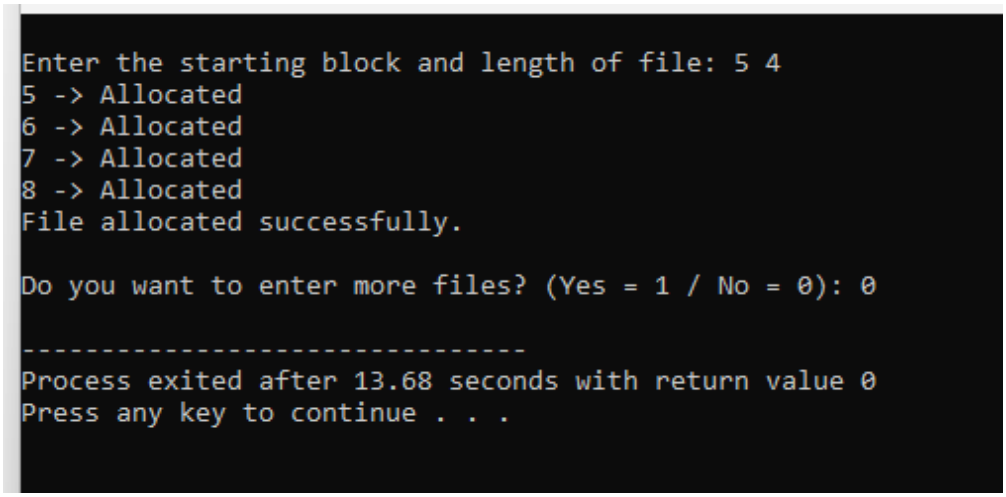
A)Sequential

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

int main() {
  int f[50], i, st, j, len, c, k;

  // Initialize all blocks to 0
  (free) for (i = 0; i < 50; i++)
    f[i] = 0;

  do {
    printf("\nEnter the starting block and length of file:
    "); scanf("%d%d", &st, &len);

    // Check if requested blocks
    are free for (j = st; j < (st + len);
    j++) {
      if (f[j] != 0) {
        printf("Block %d is already allocated.\n",
        j); break;
```

```
}
```

```
    }

    // If all blocks are free,
    allocate them if (j == (st + len))
    {
      for (k = st; k < (st + len);
        k++) { f[k] = 1;
        printf("%d -> Allocated\n", k);
      }
      printf("File allocated successfully.\n");
    } else {
      printf("File allocation failed. Try again.\n");
    }

    printf("\nDo you want to enter more files? (Yes = 1 /
    No = 0): "); scanf("%d", &c);

  } while (c == 1);

  return 0;
}
```

Output:


Enter the starting block and length of file: 5 4
5 -> Allocated
6 -> Allocated
7 -> Allocated
8 -> Allocated
File allocated successfully.
Do you want to enter more files? (Yes = 1 / No = 0): 0

Process exited after 13.68 seconds with return value 0
Press any key to continue . . .

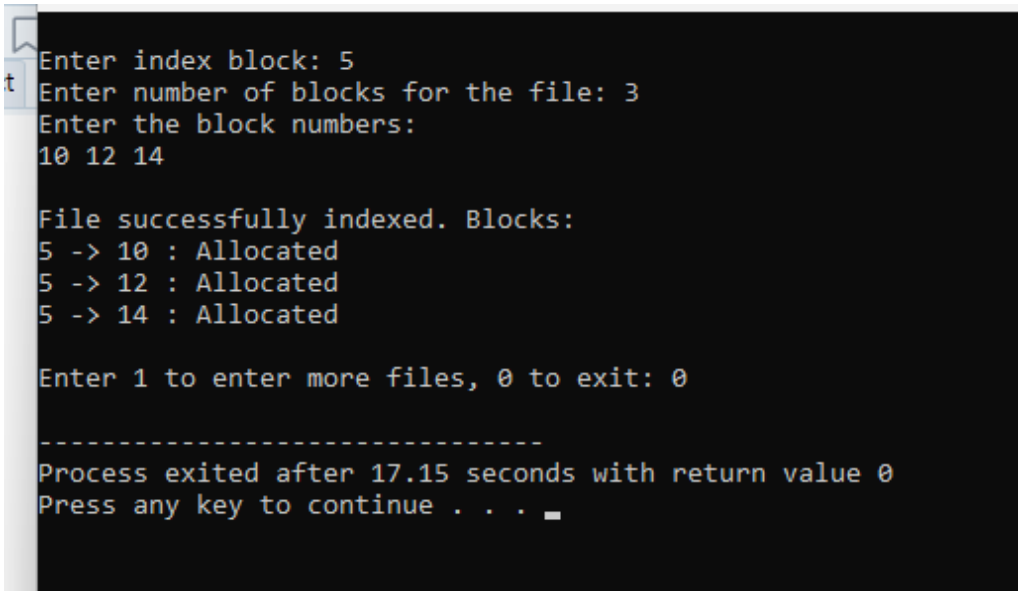
B)INDEXED

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

int main() {
   int f[50], i, j, k, indexBlock, n, blocks[50], c;

   // Initialize all disk blocks to 0
   (free) for (i = 0; i < 50; i++)
      f[i] = 0;

   do {
      printf("\nEnter index block: ");
      scanf("%d", &indexBlock);

      if (f[indexBlock] == 0) {
         f[indexBlock] = 1;

         printf("Enter number of blocks for the file: ");
         scanf("%d", &n);

         printf("Enter the block
         numbers:\n"); for (i = 0; i < n; i++)
            scanf("%d", &blocks[i]);

         // Check if any of the blocks are already
         allocated for (i = 0; i < n; i++) {
            if (f[blocks[i]] == 1) {
```

```
printf("Block %d is already allocated. Allocation failed.\n", blocks[i]);
```

```
                goto skip;
            }
        }

            // Allocate all
        blocks for (j = 0; j <
        n; j++) f[blocks[j]] =
                    1;

        printf("\nFile successfully indexed.
        Blocks:\n"); for (k = 0; k < n; k++)
            printf("%d -> %d : Allocated\n", indexBlock, blocks[k]);

    } else {
        printf("Index block already allocated.\n");
    }

    skip:
    printf("\nEnter 1 to enter more files, 0 to exit: ");
    scanf("%d", &c);

} while (c == 1);

return 0;
}
```

Output:


Enter index block: 5
Enter number of blocks for the file: 3
Enter the block numbers:
10 12 14
File successfully indexed. Blocks:
5 -> 10 : Allocated
5 -> 12 : Allocated
5 -> 14 : Allocated
Enter 1 to enter more files, 0 to exit: 0

Process exited after 17.15 seconds with return value 0
Press any key to continue . . .

C) LINKED

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

int main() {
   int f[50], p, i, j, k, a, st, len, n, c;

   // Initialize all blocks to 0
   (free) for (i = 0; i < 50; i++)
      f[i] = 0;

   printf("Enter how many blocks are already allocated:
   "); scanf("%d", &p);

   printf("Enter the block numbers that are already
   allocated:\n"); for (i = 0; i < p; i++) {
      scanf("%d", &a);
      if (a >= 0 && a < 50)
         f[a] = 1;
   }

   do {
      printf("\nEnter the starting index block and the length of the file: ");
      scanf("%d %d", &st, &len);

      int allocated = 1;

      // Check availability
      for (j = st; j < st + len; j++)
         { if (f[j] == 1) {
            allocated =
            0; break;
         }
      }

      if (allocated) {
         // Allocate blocks
         for (j = st; j < st + len; j++)
            { f[j] = 1;
            printf("%d -> Allocated\n", j);
         }
         printf("File allocated successfully.\n");
      } else {
         printf("Requested blocks are already allocated. File cannot be allocated.\n");
```

```
}
```

```
        printf("\nDo you want to enter another file? (yes-1 /
        no-0): "); scanf("%d", &c);

    } while (c == 1);

    return 0;
}
```

Output:

```
Enter how many blocks are already allocated: 3
Enter the block numbers that are already allocated:
3 4 5

Enter the starting index block and the length of the file: 6 4
6 -> Allocated
7 -> Allocated
8 -> Allocated
9 -> Allocated
File allocated successfully.

Do you want to enter another file? (yes-1 / no-0): 1

Enter the starting index block and the length of the file: 3 2
Requested blocks are already allocated. File cannot be allocated.

Do you want to enter another file? (yes-1 / no-0): 0

--------------------------------
Process exited after 42.49 seconds with return value 0
Press any key to continue . . .
```