

CC4 Laboratory Activity #4
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Topics Covered: Records and Field Addressing

Estimated Completion Time: 2 meetings (4 hours)

Objectives:

1. To appreciate how Records occupy memory space and how the operating system and programming language work together for posteriori estimation.
2. To be able to simulate how Records and Fields inside a Record are stored and accessed in memory when used as data structures in a program.

Problem: Create a running program that generates formulae to compute Field Addressing specific to a certain Record for any number of dimension the user inputs for a Database. Your program should:

- a. Ask the user to input the desired number of dimensions of the database
- b. Ask the user to input the upper bounds of each dimension
- c. Ask the user for the number of fields in each record
- d. Ask the user for the Identifier/Name of each field, its Length, and its Datatype
- e. Compute and display the Field esize
- f. Ask the user for the starting address
- g. Compute and display the esize of each record
- h. Compute and display the total number of records the database can hold
- i. Compute and display the total memory space consumed by the database
- j. Let the user search for specific Fields (through the Identifier/Name) in any of the Records
- k. Output the computed memory address based on the formulae generated as per the number of dimensions

Sample Output:

```
Enter database dimensions: 1
Upper Bound 1 : 5

Number of fields in each record: 2
FIELD 1 NAME: StudentName
FIELD 1 LENGTH: 50
FIELD 1 DATATYPE: char

Data Field StudentName is 50 bytes in size.

FIELD 2 NAME: Age
FIELD 2 LENGTH: 1
FIELD 2 DATATYPE: int

Data Field Age is 2 bytes in size.

Enter Starting address: 2000
Esize per record: 52
Your database can hold 5 records.
Your database consumes 260 bytes of memory space.

SEARCH FOR THE ADDRESS OF A FIELD IN A SPECIFIC RECORD FROM THE DATABASE
Input record search index at dimension 1: 3
Input field name to search in the record: Age
The address of this record's Age is located at: 2154.0
```

```
Enter database dimensions: 1
Upper Bound 1 : 5

Number of fields in each record: 2
FIELD 1 NAME: StudentName
FIELD 1 LENGTH: 50
FIELD 1 DATATYPE: char

Data Field StudentName is 50 bytes in size.

FIELD 2 NAME: Age
FIELD 2 LENGTH: 1
FIELD 2 DATATYPE: int

Data Field Age is 2 bytes in size.

Enter Starting address: 2000
Esize per record: 52
Your database can hold 5 records.
Your database consumes 260 bytes of memory space.

SEARCH FOR THE ADDRESS OF A FIELD IN A SPECIFIC RECORD FROM THE DATABASE
Input record search index at dimension 1: 5
Input field name to search in the record: Age
The address of this record's Age is located at: 2258.0
```