Programming technique by using java

Second class

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Lesson 10//

Storage management problems

1- **Garbage:** the Do is garbage when all access paths to a DO are Destroyed.
2- **Dangling references**: A dangling reference is an access path that continues to exist after the lifetime of the associated data object.

Declaration and type checking for DS:

The DSs are more complex than elementary Dos. For example:
A: array [1….10,-5…..5] of real;
Specifies the following

attributes of array A:

1- DT is an array .
2- Number of dimensions is two.
3- Subscripts naming the rows are the integers from 1 to 10.
4- Subscripts naming the columns are the integers from -5 to 5.
5- Number of components is 110 (10 rows *11 columns).
6- DT of each compound is real.

Vectors and arrays:

A **vector** is a DS composed of a fixed number of components of the same type organized as a simple linear sequence.
A component of a Vector is selected by giving its subscript, an integer indication
the position of the component in the sequence.

Vector = linear array = one-dimensional array.

A two –dimensional array (**matrix**) has its components organized into rectangular grid of rows and columns.

- **Vectors**

The attributes of vector are :

1- Number of components.
2- Data type of each component.
3- Subscript to be used to select each compound.

Example

V: array [1….10] of real; ⟶ float a [10]
Which defines a vector of 10 components , each a real number,
Where the components are selected by the subscripts 1,2,……10

Vector
LB
UB
Integer
E

Data type

Lower subscript bound

Upper = =

Data type of component

Size of component

A[LB]

A[LB+1]

A[UB]

Full descriptor representation of vector A

Operation on Vectors:

Subscripting is operation that selects a component from a vector E.g., A[I+2]

Other operation on vectors:
*Create vector
*Destroy vector
*Assignment to components of a vector
*Arithmetic operations on a pairs of vectors of the same size.

Implementation

Vector ⟶ Homogenous +fixed size.
Homogeneity implies that size and structure of each component is the same.
Fixed size implies that the number and position of each component of a vector are invariant through out its lifetime.
A Sequential storage representation is appropriate as shown above.
Where components are stored sequentially.
*Homogenous
*Fixed size
*Sequential storage representation
Accessing formal at EA(X[I])= &-LB*E+I*E
The accessing formula for L-value of vector component:

L-Value(A[I])= &+(I-LB)*E
=&-LB*E+(I*E)
=K+I*E

K represent the address than the element 0 of the vector would occupy . virtual origin (V0) is the address of element 0 when the lower bound is greater than 0.

The algorithm for building vector and generating the accessing formula:-

1- on creation of vector storage:-
Allocate D+N*E memory location

N: Number of Components.
D: The size of descriptor.
E: The size of components

2- Compute the virtual origin V0= &-LB*E
3- On accessing a vector component the:
L-value of any component
A[I]is computed as:-
L-value (A[I])= V0+I*E