CS 101 Computer Programming and Utilization

Lecture 7

Loops and Arrays

Feb 1 Tuesday 2:00-3:25 FCK D4

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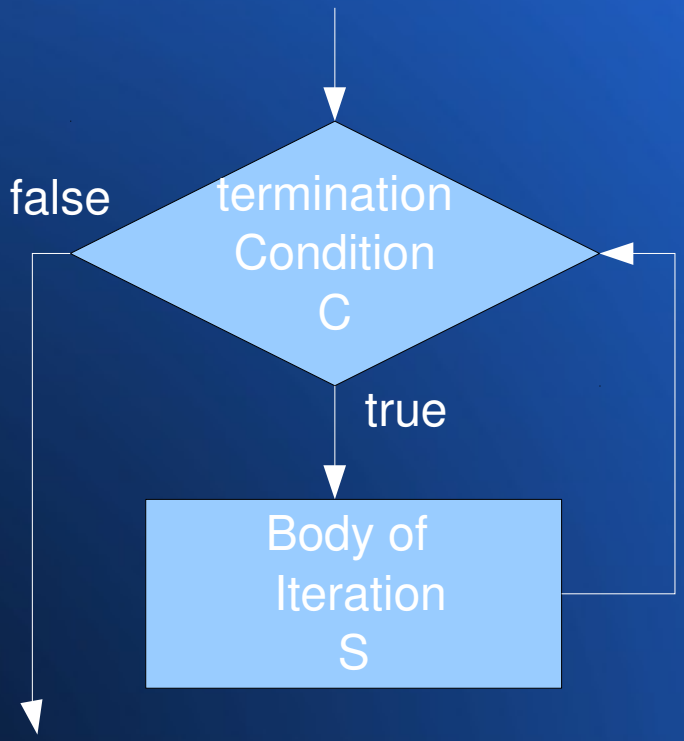
Revision: Iteration continued.. and arrays

- Control flow diagrams
  - Has its own rules
    - Boxes, diamonds, and arrows
  - While do flowchart
  - Do while flowchart
- Typical variable usage inside iterations
  - Flag
  - Counter
  - Iteration/loop index
  - Temporary variables

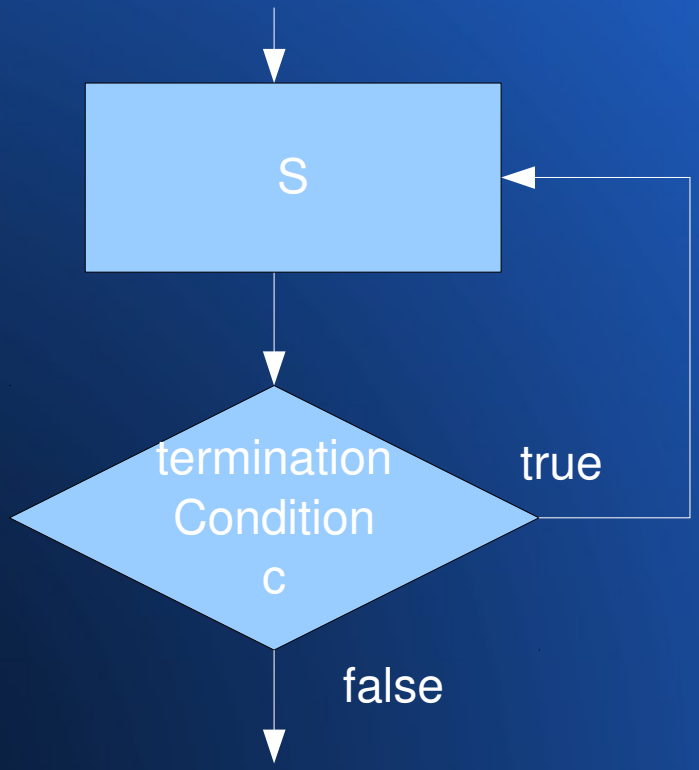
- Arrays as collections of values
- Array index
- Array declarations
- Array initialization
- Looping over arrays
  - Loop index as Array index
- For loop
  - All at one place
    - Initialization, termination, step
- Control flow diagram for 'for loop'- as exercise.

Control Flow Diagram for 'while loop'



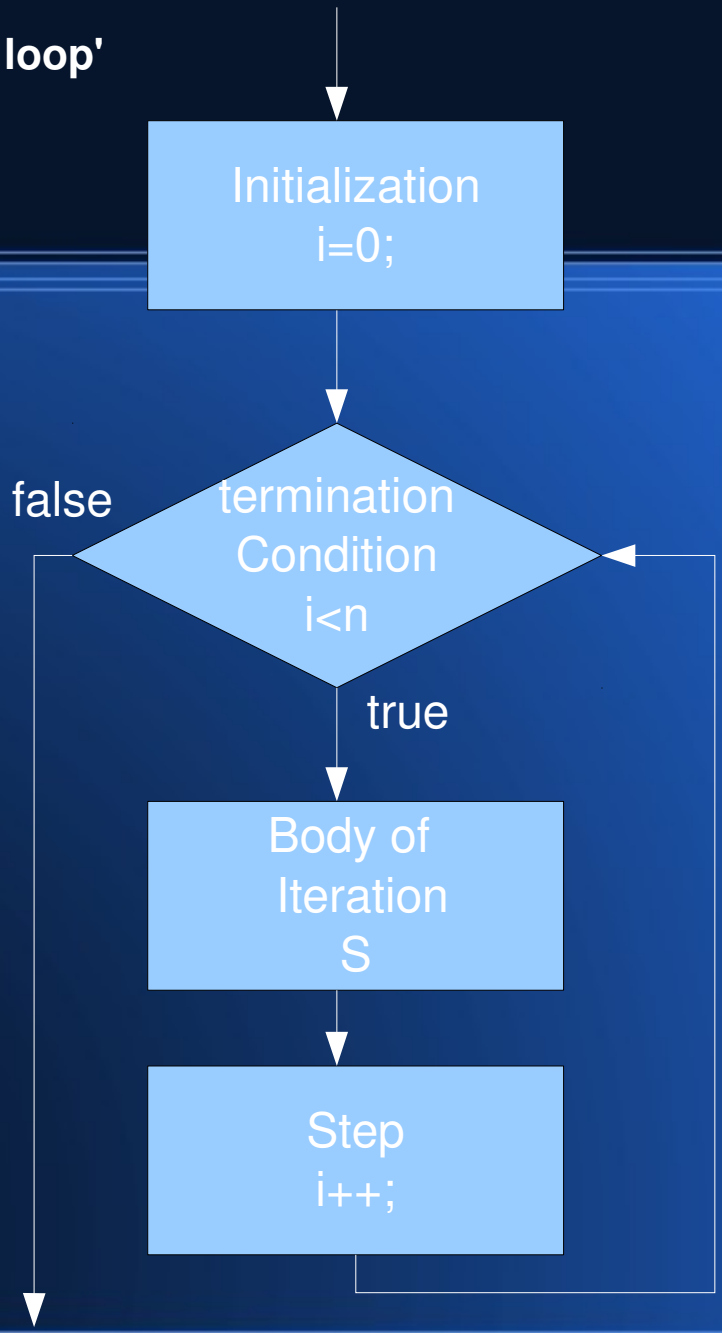
While (C) S;

Control Flow Diagram for 'do while loop'



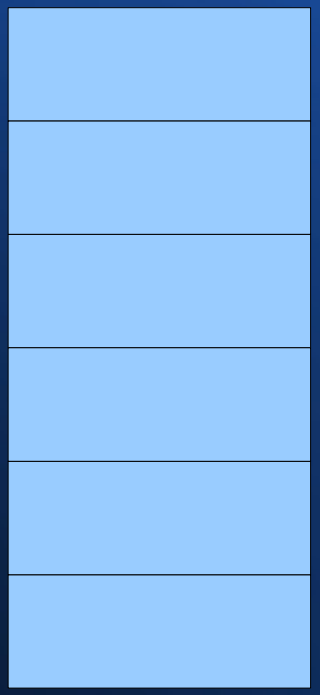
do S while (c);

Control Flow Diagram for 'for loop'



for (i=0; i<n; i++) S;

Array Storage



int A[6];

Total size of array
no. of elements * size of each element

If values are of type integer,

Total size of the above array=
6*sizeof (int) bytes
i.e. 24 bytes all in all

Indices are counted from 0 onwards
Similary locations can be counted from 0 onwards

Start location of element no. 4=?
Start location of element no. 2=?

For loop for iterating over arrays

```
Int A[10];
....?
for (i=0; i<10; i++) {
        ..... ?
}
```

Nesting while/do while loops

```
While (..) {
   While (..) {


   }


  .....
}
```

Eliminate nesting if you can

- Can the inner nesting be merged with the outer nesting?
- Example problems from lab3

For loop nesting and single dimensional arrays

```
int A[10];
....?
for (i=0; i<10; i++) {
    for (j=0; j<10; i++) {
        ..... ?
    }
}
```

Making solutions to problems..

- Find min
- Find max
- Find second max
- Difference between max and min
- Sort increasing order
- Sort decreasing order
- Pi series, sine series, e series..
- Computing Average
- Cycle detection (each value indicates who's next)