CS 101: Computer Programming and Utilization

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(Abhiram Ranade's slides, borrowed and edited)
Lecture 10

Today's Lecture

- The do-while statement
- The for loop
- GCD of two numbers

The do-while statement

Form: `do body while (condition)`

1. Execute `body`. `body` can be a single statement or a block, in which case all the statements in the block will be executed.
2. Evaluate `condition`.
3. If true, go back and execute from step 1.
4. If `false`, execution of statement ends.

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The for statement: motivation

- Example: Write a program to print a table of cubes of numbers from 1 to 100.

```
int i = 1;
repeat(100){
   cout << i <<‘ ‘<< i*i*i << endl;
   i++;
}
```

- This idiom: do something for every number between x and y occurs very commonly.
- The `for` statement makes it easy to express this idiom, as follows:

```
for(int i=1; i<= 100; i++)
   cout << i <<‘ ‘<< i*i*i << endl;
```

- We will see how this works next.

The for statement

Form `for(initialization;condition;update) body`

- `initialization, update` : Typically assignments (no semi-colon).
- `condition` : boolean expression.

Execution

- Before the first iteration of the loop the `initialization` is executed.
- Within each iteration:
  - `condition` is first tested.
  - If it fails, the loop execution ends.
  - If the `condition` succeeds, then the `body` is executed.
  - After that the `update` is executed. Then the next iteration begins

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Euclid's Theorem

Let m >= n > 0 be positive integers.

If n divides m then GCD(m,n) = n.

Otherwise GCD(m,n) = GCD(n, m%n).