

ESc101 : Fundamental of Computing

I Semester 2008-09

Lecture 19

- **Programming Methodologies**

Programming methodology : from past to present

1. Time : Invention of computers

Programming methodology : **binary machine instructions**

worked for programs of less than 100 instructions.

2. Time : Little later ...

Programming methodology : **Assembly languages**

```
5    00001000 303C FFFE      main    MOVE.W    #$00FFFE,D0    ;x:=y
6    00001004 5240                      ADD.W     #$0001,D0    ;x:=x+1
7    00001006 5240                      ADD.W     #$0001,D0
```

worked well for programs of few 100 instructions.

Programming methodology : from past to present

1. Time : 1950's

Programming methodology : High Level Language

The language : Fortran

longer but not easy to understand programs

2. Time : 1960's

Programming methodology : Structured Programming

The languages : Pascal, C, C++

Structured Programming : using methods

- To solve a problem, divide it into smaller subproblem.
- Divide each smaller sub-problem into further smaller sub-sub-problems until they become easy to solve (code should be 10-20 lines).
- finally for each problem, sub-problems, sub-sub-problems, write a separate method.

worked well for reasonably complex programs

Advantages of structured programming

- It is an easier way to design solution of the problem.
- It is easy to code since each method will be a small piece of code.
- The program becomes more manageable.
- It reduces the chances of logical errors.

worked well for reasonably complex programs

but not for large projects (thousands of lines)

Most advanced Program Methodology

Object Oriented Programming

- it has the best ideas of structured programming.
- it uses a new concept : **object**

Java : An object oriented programming language

Java

Partial Information we got till now from the course:

`class` is a collection of related methods

Java

Partial Information we got till now from the course:

`class` is a collection of related methods

But, there are more powerful features of class from OOP perspective ...

Main difference between structured programming and OOP

A program can be visualized from two different points

1. what is happening : **code**
2. what is being affected : **data**

Main difference between structured programming and OOP

1. Structured programming is centered around **code**

Approach : *“code acting on data”*

2. Object oriented programming is centered around **data**

Approach : *“data controlling access to code”*

In the next few weeks we shall discuss

Object oriented programming in JAVA

1. object
2. class (the key ideas ...)
3. encapsulation
4. polymorphism
5. inheritance

Mock lab test next week

1. It starts at 2:00 PM sharp.
2. The problem sheet will be handed over then and there.
3. You will not have access to other students' files
4. No help from TAs.
5. You will not have access to Internet.
6. You are allowed to bring a few blank sheets of paper.
7. It ends at 5:00 PM sharp.