

## ENG 101 Structured Programming

Dr. Emil Jovanov  
Electrical and Computer Engineering  
University of Alabama in Huntsville  
[emil.jovanov@uah.edu](mailto:emil.jovanov@uah.edu)  
<http://www.ece.uah.edu/~jovanov>

### Structured Programming

- ▶ Structured programming is the set of design and implementation processes that yield well-structured programs.

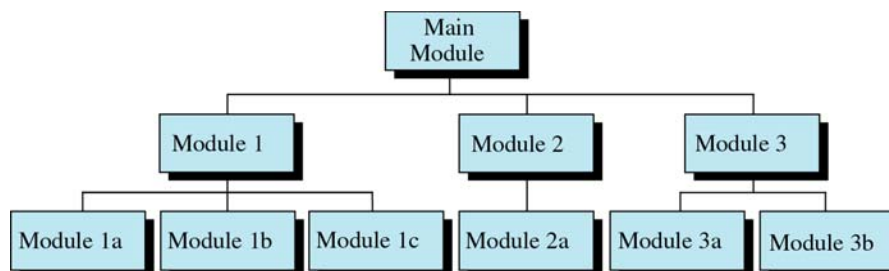
## Structured Programming

- ▶ A disciplined approach to programming
- ▶ Top-down design
- ▶ Step-wise refinement using a restricted set of program structures
  - ▶ Sequence
  - ▶ Choice
  - ▶ Loop



## Top-Down Design

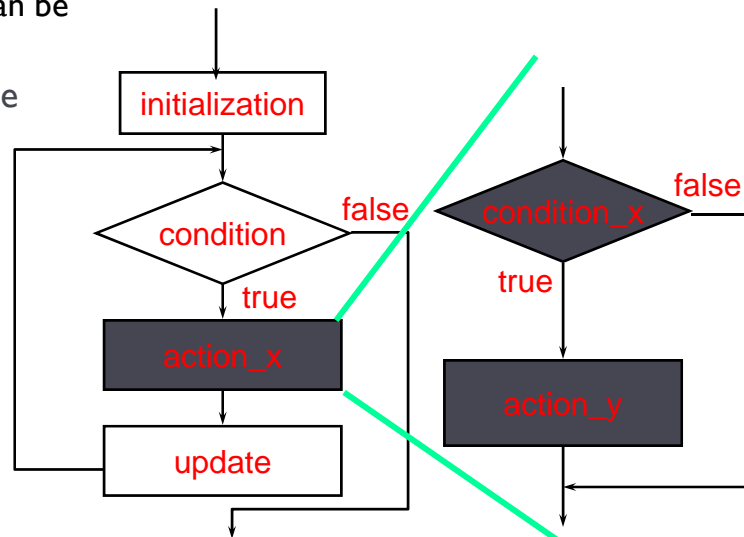
- ▶ A program is divided into a main module and its related modules.
- ▶ Each module is in turn divided into submodules until the resulting modules are understood without further division.



## Stepwise Refinement

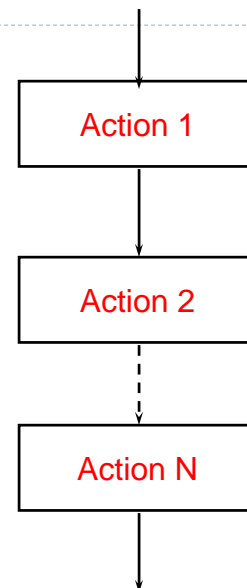
Any **action** can be another:

- ▶ Sequence
- ▶ Choice
- ▶ Loop



## A Sequence

It is natural to write a program as a sequence of program structures such as sequences, choices and loops.

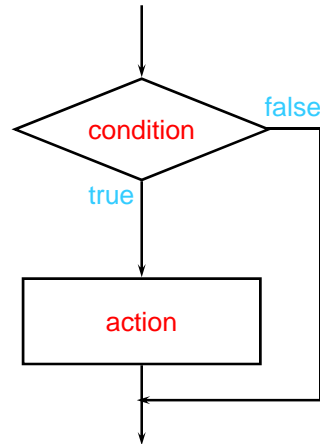


## A Choice Statement

### ► Syntax

```
if(condition)
    action
```

- if the **condition** is **true** then execute the **action**.
- **action** is either a single statement or a group of statements within braces.

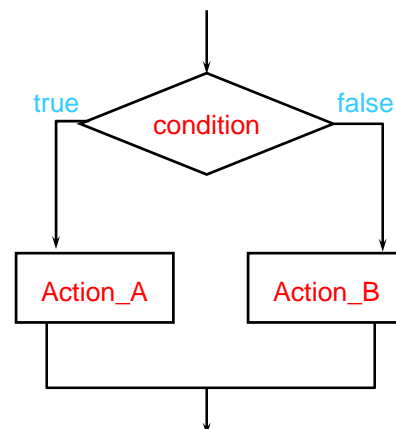


## Another Choice Statement

### ► Syntax

```
if (condition)
    Action_A
else
    Action_B
```

- if the **condition** is **true** execute **Action\_A**
- else** execute **Action\_B**.



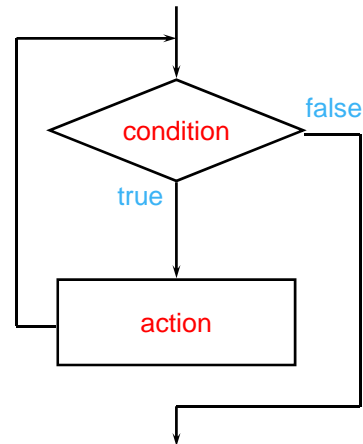
## A Loop Statement

### ► Syntax

```
while (condition)
    action
```

### ► How it works:

- if **condition** is **true** then execute **action**
- repeat this process until **condition** evaluates to **false**
- **action** is either a single statement or a group of statements within braces.



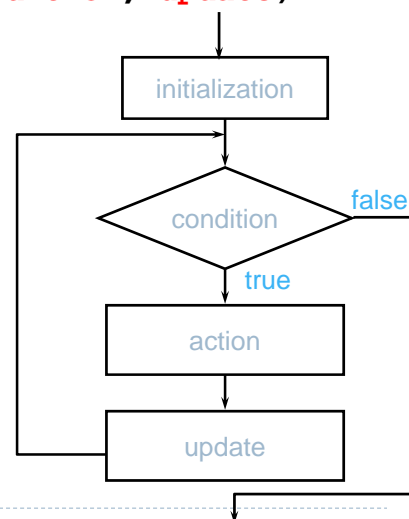
## Another Loop Statement

### ► Syntax

```
for (initialization; condition; update)
    action
```

### ► How it works:

- execute **initialization** statement
- while **condition** is **true**
  - execute **action**
  - execute **update**



## Another Loop Statement

- ▶ Syntax

```
do action  
while (condition)
```

- ▶ How it works:

- ▶ execute **action**
- ▶ if **condition** is **true** then execute **action** again
- ▶ repeat this process until **condition** evaluates to **false**.
- ▶ **action** is either a single statement or a group of statements within braces.

