

Programming for Mobile Computing

EECS 1022

`moodle.yorku.ca`

Control Structures

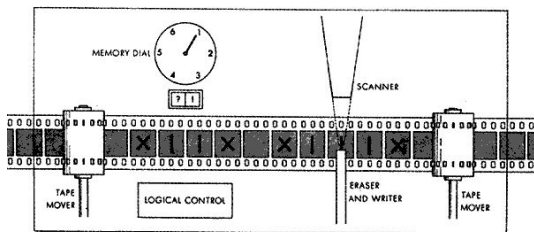
- if statement
- if-else statement
- switch statement
- for statement
- while statement
- do statement

Any of the last three control structures makes Java a so-called **Turing complete** language.

Turing completeness

Definition

A programming language is *Turing complete* if a simulator of a Turing machine can be written in the programming language.



Alan Turing (June 23, 1912–June 7, 1954) was an English mathematician. He formalized the notion of computation by means of a machine. This machine was later named the **Turing machine**. The Turing award, the “Nobel prize of computing” is named after him.



source: iee.org

Problem

Prompt the user for input

```
import franck.Grid;
```

```
int choice = Grid.getInput();
```

create a 1×1 grid

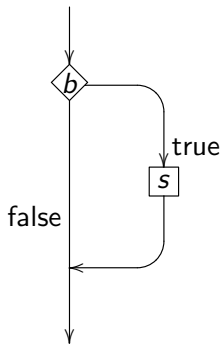
```
Grid grid = new Grid(1);
```

and set the single cell of the grid to red if the user entered 0 and to blue if the user entered 1

```
... grid.set(0, Color ...);
```

If statement

```
if (b)  
{  
    s  
}
```



Syntax:

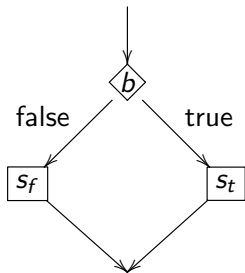
```
if (booleanExpression)
{
    statements
}
```

Code conventions:

- if should be followed by a single space and
- the body should be indented.

If-else statement

```
if (b)
{
    st
}
else
{
    sf
}
```



Syntax:

```
if (booleanExpression)
{
    statements
}
else
{
    statements
}
```

Code conventions:

- if should be followed by a single space and
- the body should be indented.

Definition

The scope of a variable is that part of the code

- starting from the declaration of the variable,
- ending with the `}` at level zero.

When we encounter the declaration, we set the level to one.

- Whenever we encounter an `{`, we increment the level by one.
- Whenever we encounter an `}`, we decrement the level by one.

```
Grid grid = new Grid(1);

int choice = Grid.getInput();
if (choice == 0)
{
    Color color = Color.RED;
}
else
{
    String color = Color.BLUE;
}
grid.set(0, color);
```

```
Grid grid = new Grid(1);

int choice = Grid.getInput();
Color color;
if (choice == 0)
{
    color = Color.RED;
}
else
{
    color = Color.BLUE;
}
grid.set(0, color);
```

Problem

Prompt the user for input

```
import franck.Grid;
```

```
int choice = Grid.getInput();
```

create a 1×1 grid

```
Grid grid = new Grid(1);
```

and set the single cell of the grid to red, blue or yellow if the user entered 0, 1 or 2

```
... grid.set(0, Color ...);
```

Problem

The same but now

0 : red

1 : blue

2 : yellow

3 : cyan

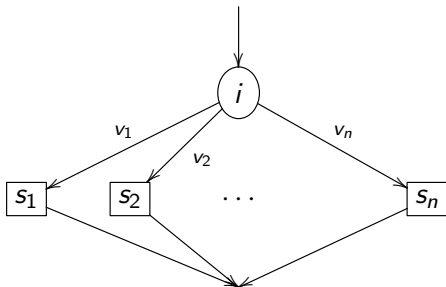
4 : magenta

5 : orange

6 : pink

Switch statement

```
switch (i)
{
  case v1 : s1
           break;
  case v2 : s2
           break;
  ...
  case vn : sn
           break;
}
```



Switch statement

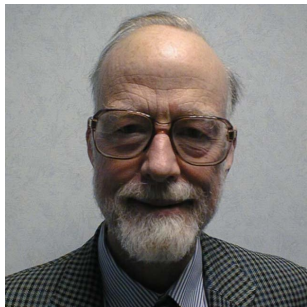
Syntax:

```
switch (integerExpression)
{
    case integerValue:
        statements
        break;
    case integerValue:
        statements
        break;
    ...
    default:
        statements
}
```


Code conventions:

- `switch` should be followed by a single space,
- `case` should be followed by a single space, and
- the body should be indented.

Sir Charles Antony Richard Hoare (born January 11, 1934) is a British computer scientist. He is best known for the development of Quicksort, an algorithm to sort elements. He also proposed the switch statement. In 1980, he received the Turing award.



source: research.microsoft.com

Switch statement without breaks

```
switch (i)
{
  case v1 : s1
  case v2 : s2
  ...
  case vn : sn
}
```

