

# Structure of our apps

```
public class ...  
{  
    public static void main(String[] args)  
    {  
        ...  
    }  
}
```

# Ingredients of the main method

## Question

Which “instructions” do we use in the `main` method?

# Ingredients of the main method

## Question

Which “instructions” do we use in the `main` method?

## Answer

- declarations  
`type variable;`
- assignments  
`variable = expression;`
- method invocations  
`class.method(arguments);` and  
`object.method(arguments);`

Many problems cannot be solved using only the above “instructions.”

# Control Structures

## CSE 5910

[www.eecs.yorku.ca/course/5910](http://www.eecs.yorku.ca/course/5910)

# Control Structures

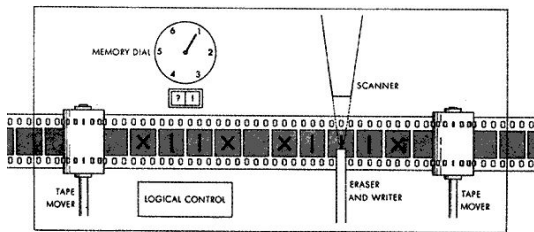
- if statement
- if-else statement
- switch statement
- for statement
- while statement
- do statement

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](http://iee.org)

## Problem

Prompt the user for input by printing

```
0 : red
```

```
1 : blue
```

```
Enter your choice:
```

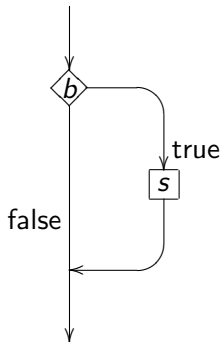
so that the choice is entered by the user on the same line as the prompt. On the next line, print

```
red or blue
```



# If statement

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



# If statement

## Syntax:

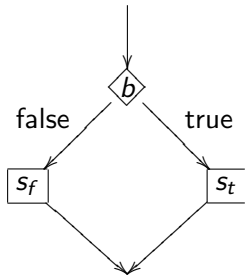
```
if (booleanExpression)
{
    statements
}
```

## Code conventions:

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

# If-else statement

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



# If-else statement

## 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.

# Scope

```
output.println("0 : red");
output.println("1 : blue");
output.print("Enter your choice: ");
int choice = input.nextInt();
if (choice == 0)
{
    String result = "red";
}
else
{
    String result = "blue";
}
output.println(result);
```

# Scope

```
output.println("0 : red");
output.println("1 : blue");
output.print("Enter your choice: ");
int choice = input.nextInt();
String result;
if (choice == 0)
{
    result = "red";
}
else
{
    result = "blue";
}
output.println(result);
```

## Problem

Prompt the user for input by printing

```
0 : red
```

```
1 : blue
```

```
Enter your choice:
```

so that the choice is entered by the user on the same line as the prompt. Using the class `franck.cse5910.Grid`, create a grid with one row and one column whose cell has the colour of the given choice.



## Problem

Prompt the user for input by printing

```
0 : red
```

```
1 : blue
```

```
2 : yellow
```

```
Enter your choice:
```

so that the choice is entered by the user on the same line as the prompt. On the next line, print

```
red or blue or yellow
```

## Problem

Prompt the user for input by printing

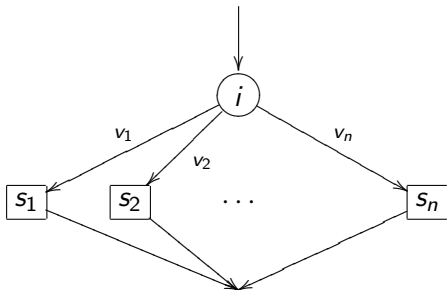
```
0 : red
1 : blue
2 : yellow
3 : cyan
4 : magenta
5 : orange
6 : pink
```

Enter your choice:

so that the choice is entered by the user on the same line as the prompt. On the next line, print the corresponding colour.

# Switch statement

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



# Switch statement

## Syntax:

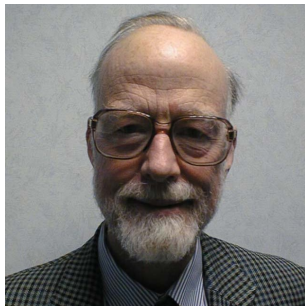
```
switch (integerExpression)
{
    case integerValue:
        statements
        break;
    case integerValue:
        statements
        break;
    ...
    default:
        statements
}
```

# Switch statement

## 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](https://research.microsoft.com)

# Switch statement without breaks

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

