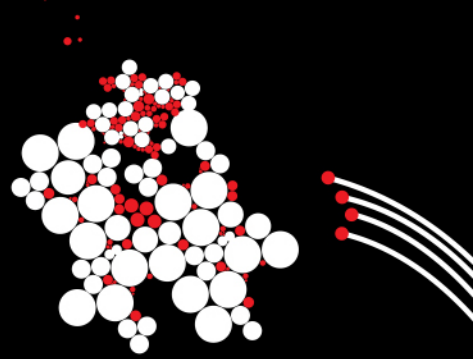
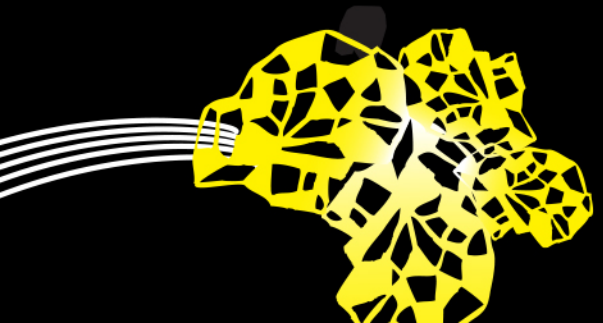
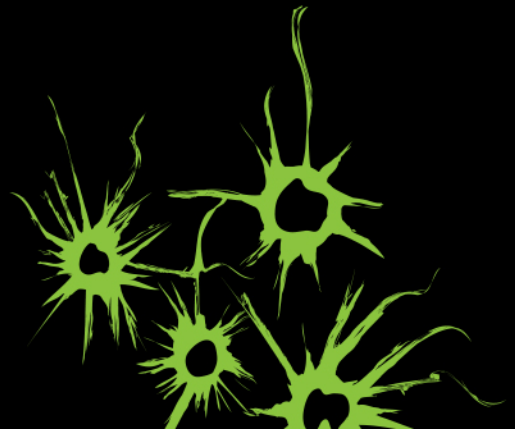
UNIVERSITY OF TWENTE.



PROGRAMMING: EXPRESSIONS

FAIZAN AHMED





EXPRESSIONS

AN EXPRESSION IS A PIECE OF PROGRAM CODE THAT REPRESENTS OR COMPUTES A VALUE

- Literals and variables can be used in expressions
  - Expressions must be assigned to variables of right type (with =)

Example

```
int duration = 3215;          // declaration + assignment
int sec = duration % 60;      // % stands for modulo
int min = duration / 60;      // integer division (no remainder)
int hr = min / 60;
min = min - 60*hr;            // re-assignment (no declaration)
boolean isOK = (duration == sec + 60*(min + 60*hr));
                              // boolean declaration + assignment
String done = "We're done"; // String assignment
```

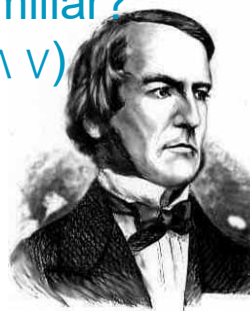
boolean comparison

duration	3215
sec	35
min	53
hr	0
isOK	true
done	"We're done"

BOOLEANS (TRUTH VALUES)

- true and false are values of type boolean
  - Values stored in variables, used in expressions
  - Operators: v1 && v2 (and), v1 || v2 (or), !v (not)
- Convention: boolean variable name refers to property
- Conditional evaluation of && and ||

Sounds familiar?
(T, F, ¬ ∧ ∨)



George Boole
1815 – 1864

```
boolean isLeapYear =
     yr % 4 == 0 && yr % 100 != 0 || yr % 400 == 0;
int febDays = isLeapYear ? 29 : 28;
boolean isEven = number % 2 == 0;
```

```
double x = 0.0, y = 1.2;
boolean xDividesY = x != 0 && y%x==0;
```

MORE EXPRESSIONS

- Constants and variables
  - Literal values: 1, -0.1, true, null, "text"
  - Named constants/variables, declared elsewhere
- Parenthesis
  - Controls the operation order in an expressions
  - Supply parameters to a constructor or method

```
double celsius1 = 5.0 / 9.0 * fahrenheit-32.0;
double celsius = (5.0/ 9.0) * (fahrenheit-32.0);
```

MORE EXPRESSION

- = vs ==
  - = is an assignment operator
  - == checks if two variables (or expressions) are equal
- & vs && (| vs ||)

```
boolean isLeapYear=year%4==0
        && year%100!=0;
```

```
boolean isLeapYear=year%4==0
        & year%100!=0;
```

- x++, x- -
  - x++ is same as x=x+1