

*ITEC1620*  
*Object-Based Programming*

Lecture 2  
Iconic Programming I

# *Sequence*

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- Standard operation of a computer
- Actions are performed in sequence
  - First action
  - Second action
  - ...
  - Last action
- Program runs same way each time

# *Actions*

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- Action
  - Manipulate data
- Iconic Programmer
  - Declare
  - Assign
  - Output

## *Declarations*

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- A computer needs to allocate storage space for all data that it manipulates
  - Declaration gives a meaningful name to the data element/storage space
- Iconic Programmer
  - Only integer data elements
  - Give name in text box

# *Assignments*

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- Once the computer has a storage space, it can store/change data in that space
- Iconic Programmer
  - Random value
  - Result of mathematical expression
  - User input

## *Mathematical Expressions*

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- $\text{value} = \text{value} + 1$  (math)
  - The value is equal to the value plus one
  - Impossible mathematically
- $\text{value} = \text{value} + 1$  (computers)
  - The storage space for value will become the previous contents plus one
- Actions: perform math, perform storage

## *Output*

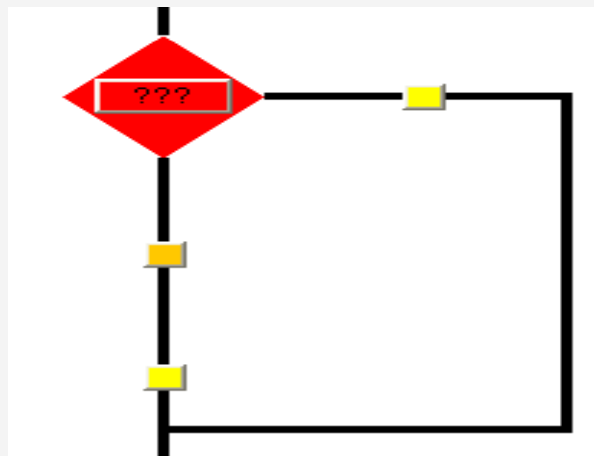
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- When computer is done with program (or during debugging), we may want to see the result – what is in a storage space
- Iconic Programmer
  - Value in storage space
  - Text information (nominally stored)

# *Branching*

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- Branching allows a program to select paths



- Diamonds represent conditions
- Two outgoing paths from condition
- Paths (with sequences) can be skipped



## *Example of Branching*

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- Program specification
  - Make withdrawal if funds are sufficient
- Program actions
  - Check account balance and withdraw amount
  - Make withdrawal
- Need to make withdrawal optional

# *Decisions*

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- Branching selects from two paths
- Two paths → two states
  - `true` (yes)
  - `false` (no)
- Diamond contains a condition
  - A condition is a `true-false` question

## *Relational Operators*

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- How to turn integers into `true/false`?
  - Greater than
  - Less than
  - Equal to
  - Not equal to
  - Greater than or equal to
  - Less than or equal to

## *Compound Conditions*

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- Allow us to put two (or more) sub-conditions into a condition
  - AND
  - OR

## AND

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- The expression is TRUE if and only if both input variables are TRUE

	TRUE 1	FALSE 0
TRUE 1	TRUE 1	FALSE 0
FALSE 0	FALSE 0	FALSE 0

## OR

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- The expression is TRUE if either input variable is TRUE

	TRUE 1	FALSE 0
TRUE 1	TRUE 1	TRUE 1
FALSE 0	TRUE 1	FALSE 0

## *Inclusive and Exclusive OR*

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- Computers use inclusive OR
  - Stop the bus if passengerA OR passengerB wants to get off
- Exclusive OR is different
  - You can get \$1000 cash back or 0% financing

*Questions?*

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## *Sample Condition 1*

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- Ensure that the savings account balance has enough to allow the withdrawal amount
  - $\text{balance} \geq \text{amount}$

## *Sample Condition II*

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- Ensure that the input is between 1 and 10
  - $1 \leq \text{input} \text{ AND } \text{input} \leq 10$

## *Sample Program 1*

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- What is your grade classification?
  - $\geq 80 \rightarrow$  honours
  - $\geq 60 \rightarrow$  pass
  - Not pass

## *Sample Program II*

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- Write a program that takes three inputs and outputs the largest value

## *Sample Programs*

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- Program 2
- Program 3
- Program 4

## *Readings and Assignments*

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- Text section (5<sup>th</sup>, 6<sup>th</sup>, or 7<sup>th</sup> edition)
  - 5.1
- Lab Assignment 1