Computer Science – Lecture 3

Karl R. Wilcox
K.R.Wilcox@reading.ac.uk
Blackboard IFP

First Pascal Program

```
program FirstOne;
// This is our first Pascal program
{$APPTYPE CONSOLE}
// line above is required to run Pascal within Delphi 6
var Prop:Char;
begin
  Write('I hope you enjoyed');
  WriteLn(' using Excel and Word; ');
  Write('now we start pascal,');
  WriteLn('everyone.');
  WriteLn; // prints a blank line
  WriteLn('Here we go!');
  ReadLn(Prop); // keeps window open until enter is
  pressed twice
end.
```

Variables

- A computer variable is a named location in memory where values can be stored and then updated as necessary. When a variable is declared the type of values that can be stored in it is also declared.
- There are four in-built types in Pascal:
  - Integer
  - Real
  - Char
  - Boolean

Variable Types

- **Integer**
  - a whole number, positive or negative, written as digits alone, for example 12345
- **Real**
  - any real number, including decimals. To express a very large or very small real number, Pascal uses floating point notation in which E stands for 'times 10 to the power of', so half can be expressed as 0.5, 5E-1 or even 0.005E2, note that Delphi will NOT accept just .5
- **Char**
  - can be any single character you can type on the keyboard like 'x' or a question mark
- **Boolean**
  - It has 2 values, true and false. We will cover Booleans further in a later lecture.

Variable Declaration

- Variables get their names and types in the variable declaration at the beginning of a Pascal program, between the heading and the statement part.
- The variable declaration begins with the reserved word `var`, then each identifier is listed along with its type.
- You can declare any number of variables, in any order, as long as a semicolon separates the variables of each type.

Assignment Operator

- The assignment operator (:=) changes the value of a variable within the program, either to give it an initial value (you must not assume variables are zero initially) or to change that value, such as
  - `Start := 0;`
  - `Gross := 102 * 1.175;`
  - `TotalSoFar := TotalSoFar + 1;`
  - `ThisOne := LastOne;`
- Notice, in the last example, `ThisOne` is changed , but `LastOne` remains as it was. Read the symbol := as 'becomes' ; it does does not mean equals. The expression on the right of := is evaluated, and the result is stored in the variable on the left and side.

Expressions

- You cannot mix types within an expression, except when you do something with an integer that will create a real number.
- Integer, Char and Boolean are all ordinal types. Given one value, you can determine the one immediately before or after it.
- Real is not ordinal, hence there are restrictions on where values of type Real can be used.

Program Twice (part 1)

```
program Twice;
{$APPTYPE CONSOLE}
// line above is required to run Pascal within Delphi 6
var Prop:Char;

// Reads the value of a variable, performs a
  calculation,
// saves new value then prints the original and saved
  values

var
  Number, NumberBy2 : Integer;
// This declares two variables that
// can store integer values
```

Program Twice (part 2)

```
begin
  Writeln('Enter a number: ');
  // after printing this message the computer waits for
  the user
  // to enter a value and press return
  ReadLn(Number);              // gets Number's value
  NumberBy2 := 2*Number;  // doubles the number and
  remembers result
  Write('The number you typed was: ');
  WriteLn(Number);             // print the original number
  Write('Twice that number is ');
  WriteLn(NumberBy2);          // prints twice that number
  ReadLn(Prop);
end.
```

Program HelloThere

```
program HelloThere;
// reads in two initials and prints a greeting
{$APPTYPE CONSOLE}
// line above is required to run Pascal within Delphi
var Prop:Char;
var FirstInit, SecondInit : Char;
begin
  WriteLn('type two initials and press return');
  ReadLn( FirstInit, SecondInit);
  Write('hello ');
  WriteLn(FirstInit, SecondInit);
  ReadLn(Prop);
end.
```

Exercises

4. Enter, compile and run the program Twice above.

5. Write a program to read in two numbers, add them, and output the result.

6. Enter, compile and run the program HelloThere.

7. Amend HelloThere to read and process 3 initials.

8. Investigate what happens if the user of HelloThere types in numbers or other characters.