

Basic Pascal Elements

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Outline

- Program Heading
- Constant / variable
- Arithmetic statement
- assign statement
- Output statement / Formatted output
- Boolean
- IF / THEN

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Pascal Program Structure

```
program myFirstProgram;
const
  myStudentId = 1234567;
var
  courseTaken: integer;
begin
  write('Please Enter a number of courses');
  read('courseTaken');
  writeln('Student', myStudentId, ' takes ', courseTaken, '
  courses in this semester');
end.
```

Program Heading

Declarations

Program Body

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Program Heading

- First sentence
- INPUT and OUTPUT (keyboard & display, File)

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Constant

- Value cannot be changed
- Syntax

```
const
  identifier = constant expression;
  .....
  identifier = constant expression;
```

- Example

```
const
  WORD = 'Hello';
  MONTH = 12;
```

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Variables

- Referred to an individual cell in memory
- Value can be changed
- Syntax

```
var
  identifier, identifier : type;
```

- Example

```
var
  width, length, total : Integer;
  i, j, k, l : Real;
  char1 : Char;
```

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Variable Types

- Integer
 - 1, 3, 1000, -345
- Real
 - 1.24, 45.0, - 77.90
- Char
 - A, a, x, t
- String
 - 'HELLO', 'Anan'
- Boolean
 - True, False

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Statement

- Between Begin End
- Output statement

```
Begin
  writeln('Hello my friend');
End.
```

- Assignment statement

```
Begin
  Total = width + length;
End.
```

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Arithmetic Expression

- Operators:
 - + - * /
 - DIV (truncated divide)
 - MOD (remainder after division)
- Example
 - 11/2 = 2.50
 - 11 DIV 2 = 5
 - 11 MOD 2 = 1

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Arithmetic Expression

- 45.00
- (width + length)
- (12*(top - bottom))
- 34+54/78*12

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Precedence rules for arithmetic operators

- () parentheses
- Unary + and -
- *, / , DIV , MOD
- + -
- If equal precedence, left to right

Examples

```
-a+j/-w      = (-a) + (j / (-w))
C*23/6+23mod2 = ((C*23)/6) + (23 mod 2)
```

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Assignment statement

- Total := width + length;
- Name := 'Anan' + ' ' + 'Phonphoem';
- Baht := 40 * dollar;
- StartTime := 0;
- Finish := False;

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Output statement

- write ();
 - After write, remember the location
 - Start at that location for the next time
- writeln ();
 - When done, go to new line and left side

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Output statement

- Write ('price =', price);
- Write ('total = ', price);
- Writeln ('the total is', ' ', total, 'unit');
- Writeln ('hello', 'how are you', 'doing');

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Formatted output

- Real_data : width
- Real_data : width : decimal
- String_data : width

```
Total = 2500;  
Writeln(total);      2500  
Writeln(total:5);   #2500  
Writeln(-total:7); ##-2500
```

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Formatted output

```
Radius = 45.9053  
Writeln(radius);    #4.5905300000E+01  
Writeln(radius:5);  #4.6E+01  
Writeln(radius:5:2); 45.91  
Writeln(radius:7:3); #45.905  
Writeln(radius:6:5); 45.90530  
Writeln(radius:6;2, radius:7:3); #45.91#45.905
```

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Boolean Expression

- Two possible values: True, False
1. Relation Operator
 - =, <, >, <>, <=, >=
 2. Boolean Operator
 - AND, OR, NOT

```
15 = 34           False  
15.05 < 17       True  
34 <> 34.00002   True
```

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Truth table

	<u>AND</u>	<u>OR</u>
T T	T	T
T F	F	T
F T	F	T
F F	F	F

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Boolean Expression

- $(30 < 15) \text{ AND } (54 < > 12)$
F T = F
- $(30 < 35) \text{ OR } (99 \leq 99.80)$
T T = T