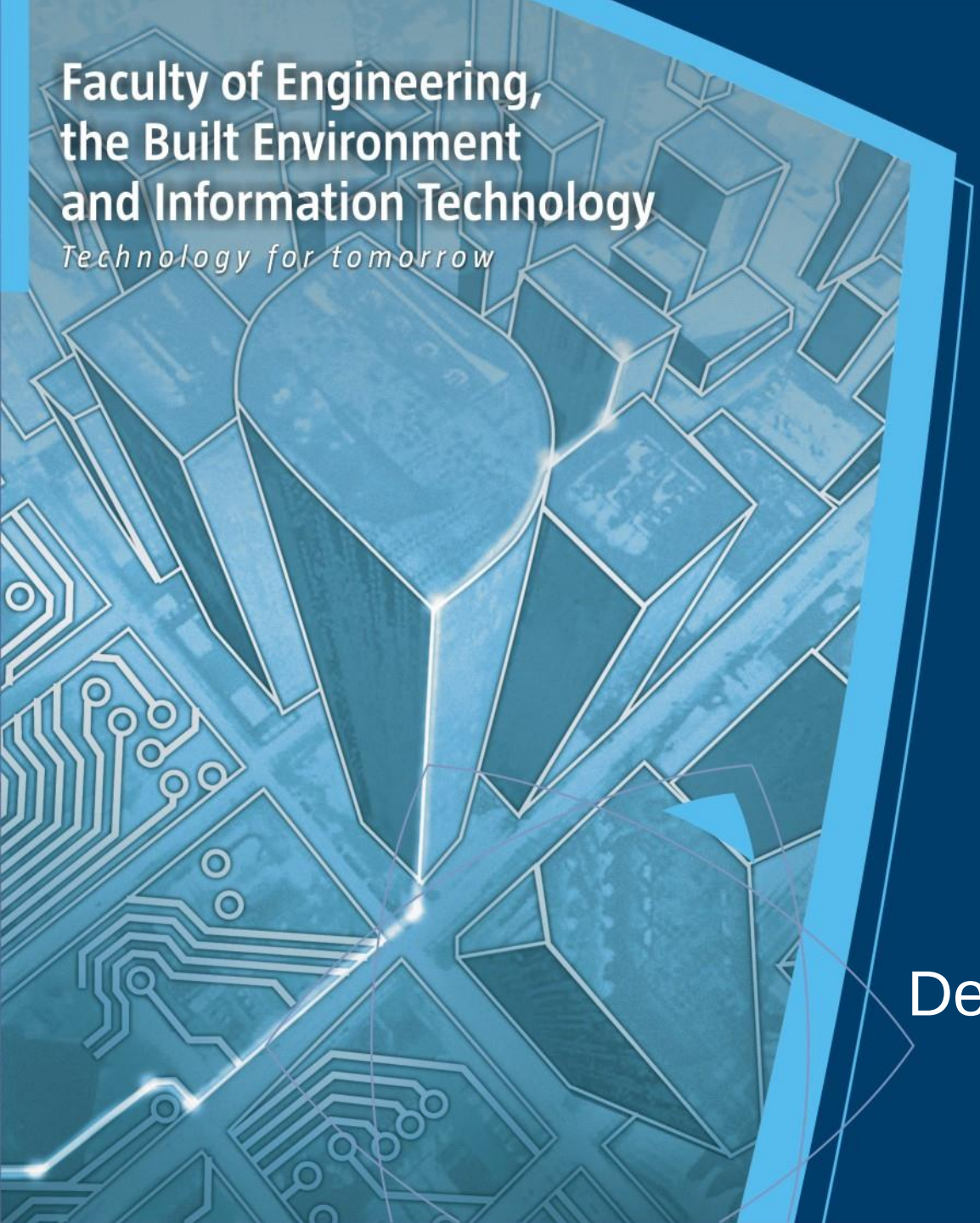

Nelson Mandela Metropolitan University

for tomorrow

Trace Tables

29/02/2016

Lecture 1

Development Software 1

(ONT1000/SDS1000)

Trace Tables

- Trace tables can be used to test an algorithm to make sure that the algorithm is free of logical errors
- A trace table usually takes the form of a multi-column, multi-row table
- Each column represents a variable, and the rows are used to show how the value of each variable changes during the execution of the algorithm

Trace Tables – Example:

- Use a trace table to determine what the values of x, y, and z will be once the code below has been executed.

```
int x = 5, y = 3, z = 4;
x = y + z;
y = x - y;
z = x + y;
```

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x	y	z
5	3	4

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z = x + y;
```

x	y	z
5	3	4
7	4	**11**

Trace Tables - Class Exercise:

- Use a trace table to determine what the values of a, b, and c will be once the code below has been executed.

```
int a = 0, b = 1, c = 5;
a = b;
b = a + b + c;
c = b - 4;
```

Trace Tables - Class Exercise Solution:

- Use a trace table to determine what the values of a, b, and c will be once the code below has been executed.

```
int a = 0, b = 1, c = 5;
a = b;
b = a + b + c;
c = b - 4;
```

a	b	c
0	1	5

Trace Tables - Class Exercise Solution:

- Use a trace table to determine what the values of a, b, and c will be once the code below has been executed.

```
int a = 0, b = 1, c = 5;
a = b;
b = a + b + c;
c = b - 4;
```

a	b	c
0	1	5

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```
int a = 0, b = 1, c = 5;
a = b;
b = a + b + c;
c = b - 4;
```

a	b	c
0	1	5
1		

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```
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b = a + b + c;
c = b - 4;
```

a	b	c
0	1	5
1		

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int a = 0, b = 1, c = 5;
a = b;
b = a + b + c;
c = b - 4;
```

a	b	c
0	1	5
1	7	

Trace Tables - Class Exercise Solution:

- Use a trace table to determine what the values of a, b, and c will be once the code below has been executed.

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int a = 0, b = 1, c = 5;
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```

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0	1	5
1	7	

Trace Tables - Class Exercise Solution:

- Use a trace table to determine what the values of a, b, and c will be once the code below has been executed.

```
int a = 0, b = 1, c = 5;
a = b;
b = a + b + c;
c = b - 4;
```

a	b	c
0	1	5
1	7	**3**

Order of Precedence

- Operator Precedence:

  the rules that determine the order in which parts of a mathematical expression are evaluated.

- Multiplication, division and remainder always take place first prior to addition or subtraction

Trace Tables - Class Exercise Solution:

- Use a … and c will …

What would the value of answer be?

```
answer = (c * b) - a;
```

```
c = b
```

a	b	c
0	1	5
1	7	3

All variables are integers

Trace Tables - Class Exercise Solution:

- Use a … and c will …

What would the value of answer be?

```
answer = (c * b) - a;
```

20 = (3 * 7) - 1

```
c = b
```

a	b	c
0	1	5
1	7	3

All variables are integers

Trace Tables - Class Exercise Solution:

- Use a … and c will …

What would the value of answer be?

```
answer = c * b - a;
```

```
c = b
```

a	b	c
0	1	5
1	7	3

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Trace Tables - Class Exercise Solution:

- Use a … and c will …

What would the value of answer be?

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answer = c * b - a;
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20 = 3 * 7 - 1

```
c = b
```

a	b	c
0	1	5
1	7	3

All variables are integers

Trace Tables - Class Exercise Solution:

- Use
wil

What would the value of answer be?

```
ans= a + c * b + b / 2 - a;
```

```
c = b
```

a	b	c
0	1	5
1	7	3

All variables are integers

Trace Tables - Class Exercise Solution:

- Use
wil

What would the value of answer be?

```
ans= a + c * b + b / 2 - a;
```

24 = 1 + 3 * 7 + 7 / 2 - 1

```
c = b
```

a	b	c
0	1	5
1	7	3

All variables are integers

Trace Tables - Class Exercise Solution:

- Use
wil

What would the value of answer be?

```
ans= a + c * b + b / 2 - a;
```

24 = 1 + 3 * 7 + 7 / 2 - 1

24 = 1 + 21 + 3 - 1

c = b

a	b	c
0	1	5
1	7	3

All variables are integers

Trace Tables - Class Exercise Solution:

- Use
wil

What would the value of answer be?

```
ans = b * c / 2;
```

```
c = b
```

a	b	c
0	1	5
1	7	3

All variables are integers

Trace Tables - Class Exercise Solution:

- Use
wil

What would the value of answer be?

```
ans = b * c / 2;
```

10 = 7 * 3 / 2

```
c = b
```

a	b	c
0	1	5
1	7	3

All variables are integers

Trace Tables - Class Exercise Solution:

- Use
wil

What would the value of answer be?

```
ans = b / c * 2;
```

```
c = b
```

a	b	c
0	1	5
1	7	3

All variables are integers

Trace Tables - Class Exercise Solution:

- Use
wil

What would the value of answer be?

```
ans = b / c * 2;
```

4 = 7 / 3 * 2

```
c = b
```

a	b	c
0	1	5
1	7	3

All variables are integers

Trace Table Exercise

- Use a trace table to determine what the values of a, b, and c will be once the code below has been executed.

```
int a = 10, b = 5, c = 3;
a = b + c * 2;
b = b + (10 - c);
c = b + b;
```

a	b	c

Trace Table Solution

- Use a trace table to determine what the values of a, b, and c will be once the code below has been executed.

```
int a = 10, b = 5, c = 3;
a = b + c * 2;
b = b + (10 - c);
c = b + b;
```

a	b	c
10	5	3
11	12	24

Trace Table Exercise

- Use a trace table to determine what the values of a, b, and c will be once the code below has been executed.

```
int a = 10, b = 5, c = 3;
a = b + c * 2;
b = b + (10 - c);
c = b + b;

a = 3; b = 5; c = 10;
a = a * b;
b = c + 7 * a / 2;
a = b;
a = b / 10;
```

a	b	c
10	5	3
11	12	24
3	5	10

Trace Table Exercise

- Use a trace table to determine what the values of a, b, and c will be once the code below has been executed.

```
int a = 10, b = 5, c = 3;
a = b + c * 2;
b = b + (10 - c);
c = b + b;

a = 3; b = 5; c = 10;
a = a * b;
b = c + 7 * a / 2;
a = b;
a = b / 10;
```

a	b	c
10	5	3
11	12	24
3	5	10
15	62	
62		
6		