Module 06: Operators

Chul Min Yeum
Assistant Professor
Civil and Environmental Engineering
University of Waterloo, Canada

UNIVERSITY OF WATERLOO
FACULTY OF ENGINEERING

M06-Q1: Which of the best describe the following script?

```
vec = [1 10 22 3 4 2 3 8 9]

num = sum(vec<10);
```

1) Count the number of single digit numbers in *vec*
2) Sum single digit numbers in *vec*
3) Sum positive numbers in *vec*
4) Sum all numbers in *vec*

M06-Q2: Which of the best describe the following script?

```
vec = [10 11 55 33 22 11 20 10]

nvec = numel(vec);
val = 0;

for ii=1:nvec

    if rem(vec(ii), 2) == 1
        val = val+vec(ii);
    end
end
```

1) Adding all numbers in *vec*
2) Adding all odd numbers in *vec*
3) Adding all even numbers in *vec*
4) Adding all numbers at odd locations in *vec*

M06-Q3: Which of the best describe the following script?

```
vec = [10 11 55 33 22 11 20 10]

num = vec(rem(vec, 2) == 0);

val = sum(num);
```

1) Adding all numbers in *vec*
2) Adding all odd numbers in *vec*
3) Adding all even numbers in *vec*
4) Adding all numbers at odd locations in *vec*

M06-Q4: What value is assigned to '`val`'?

```
char_vec = 'aaabbbcccdddeeeaaabbb';

nchar = numel(char_vec);

val = 0;
for ii=1:nchar

    isa = char_vec(ii) == 'a';
    isb = char_vec(ii) == 'b';

    if or(isa, isb)
        val = val + 1;
    end
end
```

★★

1) 6
2) 10
3) 12
4) 16

M06-Q5: What value is assigned to ‘val’?

```
char_vec = 'aaabbbcccdddeeeaaabbb';

sa = sum(char_vec == 'a');
sb = sum(char_vec == 'b');

val = sa + sb;
```

1) 6
2) 10
3) 12
4) 16

★★

M06-Q6: What is a value assigned to *val*?

```
vec1 = [2 1 5 7 4 -2 3 -9 4 1];
vec2 = [2 1 5 9 5 -2 3 -7 4 0];

s1 = sum(vec1 ~= vec2);
s2 = sum(vec1 > vec2);

val = s1- s2;
```

1) 1
2) 2
3) **3**
4) 4

★★

M06-Q7: What is a value assigned to *val?*

```
vec = 'aeiou'

char_vec = 'matlab is really fun!'

val = 0;
for ii=1:numel(vec)

    if any(char_vec == vec(ii))

        val = val+1;

    end
end
```

1) 6
2) **4**
3) 5
4) 7

★★

M06-Q8: What is a value assigned to *val?*

```
vec = [1 10 22 3 4 2 3 8 9]

lg1 = vec < 10;
lg2 = rem(vec, 2) == 1;

tmp = vec(lg1 & lg2);

val = sum(tmp);
```

1) 7
2) 9
3) 16
4) 3

M06-Q9: Which of the best describe the value in *val*?

```
mat1 = [1 -2 3; 4 -5 -6; -7 8 9];

lg_mat1 = mat1 > 0;
lg_mat2 = rem(mat1,2) == 0;

vec1 = mat1(lg_mat1 & lg_mat2);

val = sum(vec1)
```

1) summation of positive even numbers in *mat1*
2) summation of positive odd numbers in *mat1*
3) summation of all numbers in *mat1*
4) summation of all even numbers in *mat1*.

M06-Q10: Do *mat1* to *mat4* have the same values?

```
mat0 = [1 2 3; 4 5 6; 7 8 9];
```

```
mat1 = mat0;
mat1(mat1> 4) = 5;
```

```
mat3 = mat0;
for ii = 1:9
    if mat3(ii) > 4
        mat3(ii) = 5;
    end
end
```

```
mat4 = mat0;
idx = find(mat4>4);
mat4(idx) = 5;
```

```
mat2 = mat0;
for ii=1:3
    for jj=1:3
        if mat0(ii,jj) > 4
            mat2(ii,jj) = 5;
        end
    end
end
```

1) Yes
2) No

M06-Q11: What is the array finally assigned to *row_new*?

row

1	0	5	7	9	0	8	0	5	2	1	0

★★

```
row_new = zeros(1, numel(row));
lg_vec = row == 0;
num = sum(lg_vec);
row_new(num+1:end) = row(~lg_vec);
```

(A) [0 0 0 0 1 5 7 9 8 5 2 1]

(B) [1 5 7 9 8 5 2 1 0 0 0 0]

(C) [1 0 5 7 9 0 8 0 5 2 1 0]

(D) No answer

M06017

1) A
2) B
3) C
4) D

M06-Q12: What is the value finally assigned to *val*?

row

1	0	5	7	9	0	8	0	5	2	1	0

★★

```
val1 = any(row==7);
val2 = ~all(row~=7);

val3 = any(row==5 | row == 3);
val4 = ~all(row~=5 & row ~= 3);

val = val1 + val2 + val3 + val4;
```

1) 1
2) 3
3) **4**
4) 2

M06-Q13: Do three scripts produce the same value of *'loc'*?

row

1	0	5	7	9	5	8	0	5	2	9	3

★★

1) Yes
2) No

```
lg1 = row == 3;
lg2 = row == 5;
lg = lg1 | lg2;

loc = find(lg);
```

```
loc1 = find(row==3);
loc2 = find(row==5);

loc = [loc1 loc2];
loc = sort(loc);
```

```
n = numel(row);

loc = [];

for ii=1:n
    if row(ii) == 3
        loc = [loc ii];
    elseif row(ii) == 5
        loc = [loc ii];
    end
end
```

M06-Q14: What is the value finally assigned to *val*?

```
lg1 = sign(mat1) == -1;
lg2 = rem(mat1,2) == 0;

lg = lg1 & lg2;

val = sum(lg, 'all');
```

1) 1
2) **2**
3) 3
4) 5

mat1

1	**-6**	**11**	**-16**
2	**7**	**12**	**17**
3	**8**	**-13**	**18**
4	**-9**	**14**	**-19**

M06013

★★

M06-Q15: What is the array finally assigned to *seq*?

```
n = 5;
seq = [];
for ii=1:n
    cur = char(('a'+ii-1) * ones(1, ii));
    seq = [seq cur];
end
```

1) A
2) B
3) **C**
4) D

(A) ‘aaaaabbbbbccccddddddeeeee

(B) ‘abcdeabcdeabcdeabcde'

(C) 'abbcccddddeeeee'

(D) No answer

★★

Q3 in S20

M06-Q16: What is the array finally assigned to *mat2d*?

```
N = 3;
tmp = sum(mat == N, 2);
idx = logical(tmp);

mat2d = mat;
mat2d(idx,:) = [];
```

1	2	3	4
5	6	7	8
1	2	3	4
5	6	7	8

mat

1) A
2) B
3) **C**

(A)

1	2	3	4
5	6	7	8

(B)

1	2	3	4
1	2	3	4

(C)

5	6	7	8
5	6	7	8

★★

Q3 in S20

M06-Q17: What is the value finally assigned to *val*?

```
mat2 = mat1 + mat1(:,1);
mat3 = mat1 + mat1(1,:);

mat4 = mat1 .* mat1(1,:);
mat5 = mat1 .* mat1(:, 1);

val = mat2(end)+ mat3(end)+ mat4(end)+ mat5(end)
```

1) 15
2) **33**
3) 20
4) 13

1	**2**
3	**4**

mat1

★★