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Lab 6 Assignment

09 - 08 - 25

Exc - 01

```
draw_Z(5)
```

```
ans = 5x5
```

```
1 1 1 1 1
0 0 0 1 0
0 0 1 0 0
0 1 0 0 0
1 1 1 1 1
```

```
draw_Z(3)
```

```
ans = 3x3
```

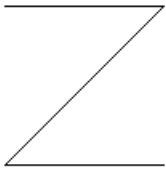
```
1 1 1
0 1 0
1 1 1
```

```
y = ~draw_Z(100)
```

```
y = 100x100 logical array
```

```
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 ...
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
⋮
```

```
imshow(y)
```



Exc - 02

```
repeat_elem(3)
```

```
ans = 1×6
      1   2   2   3   3   3
```

```
repeat_elem(5)
```

```
ans = 1×15
      1   2   2   3   3   3   4   4   4   4   5   5   5 ...
```

```
repeat_elem(1)
```

```
ans = 1
```

Exc - 03

```
Goldbach(10)
```

```
ans = 1×2
      3   7
```

```
Goldbach(500000)
```

```
ans = 1×2
      31  499969
```

```
Goldbach(2)
```

Error using eee_4416_ass_6>Goldbach
Numbers below or equal to 2 and odd numbers don't satisfy the conjecture.

```
Goldbach(101)
```

Exc - 04

```
arith_op(20, 10, 'sub')
```

```
ans = 10
```

```
arith_op(5, 10, 'div')
```

```
ans = 0.5000
```

```
arith_op(22, 10)
```

```
ans = 2
```

```
arith_op(22)
```

```
Not enough input arguments.
```

```
Error in eee_4416_ass_6>arith_op (line 91)  
    result = mod(a, b);
```

Exc - 05

```
diag_dominant([5 0; 1, 5])
```

```
ans = logical  
     1
```

```
diag_dominant([5, 0, 0, 10; 1, 5, 5, 10; 2, 4, 4, 5; 3, 2, 2, 1])
```

```
ans = logical  
     0
```

```
diag_dominant([-2, 2, 1; 1, 3, 2; 1, -2, 0])
```

```
ans = logical  
     0
```

```
diag_dominant([-4, 2, 1; 1, 6, 2; 1, -2, 5], 'strict')
```

```
ans = logical  
     1
```

```
diag_dominant([5, 0, 0; 1, 5, 2; 2, 4, 6], 'strict')
```

```
ans = logical  
     0
```

```
diag_dominant([5, 0, 0; 1, 5, 2; 2, 4, 6], 'weak')
```

```
ans = logical  
     1
```

Exc - 06

```
knight_moves([5,5])
```

```
ans = 8x2
```

```
7    6
6    7
4    7
3    6
3    4
4    3
6    3
7    4
```

```
knight_moves([1,1])
```

```
ans = 2x2
```

```
3    2
2    3
```

```
knight_moves([8,8])
```

```
ans = 2x2
```

```
6    7
7    6
```

```
knight_moves([8,9])
```

```
Error using eee_4416_ass_6>knight_moves
Invalid position
```

Exc - 07

```
repeat_elem_v2(3)
```

```
ans = 1x6
```

```
1    2    2    3    3    3
```

```
repeat_elem_v2(5,4)
```

```
ans = 1x9
```

```
4    4    4    4    5    5    5    5    5
```

```
repeat_elem_v2(1)
```

```
ans = 1
```

```
repeat_elem_v2(1,8)
```

```
ans =
```

```
[]
```

```
repeat_elem_v2(6,6)
```

```
ans = 1×6
```

```
6 6 6 6 6 6
```

```
function Z = draw_Z(n) %% ex 01
```

```
if n <= 2
```

```
    disp('n must be greater than 2.');
```

```
    return;
```

```
end
```

```
Z = zeros(n);
```

```
Z(1, :) = 1;
```

```
Z(n, :) = 1;
```

```
for i = 1:n
```

```
    Z(i, n - i + 1) = 1;
```

```
end
```

```
end
```

```
%% ex 02
```

```
function res = repeat_elem(n)
```

```
res = [];
```

```
for i = 1:n
```

```
    for j = 1:i
```

```
        res = [res, i];
```

```
    end
```

```
end
```

```
end
```

```
%% ex 03
```

```
function prime_set = Goldbach(n)
```

```
if n <= 2 || mod(n,2) == 1
```

```
    error("Numbers below or equal to 2 and odd numbers don't satisfy the  
conjecture.");
```

```
end
```

```

prime_set = [];
primes_list = primes(n);
len = length(primes_list);

for i = 1:len
    for j = i:len
        if primes_list(i) + primes_list(j) == n
            prime_set(end+1,:) = [primes_list(i), primes_list(j)];
        end
    end
end

prime_set = sort(prime_set(1,:));

end

%% ex 04
function result = arith_op(a, b, op)
if nargin < 3
    result = mod(a, b);
else
    switch op
        case 'add'
            result = a + b;
        case 'sub'
            result = a - b;
        case 'mul'
            result = a * b;
        case 'div'
            result = a / b;
        otherwise
            result = mod(a, b);
    end
end
end

%% ex 05
function isDominant = diag_dominant(A, dominance_type)
if nargin < 2
    dominance_type = 'weak';
end

[m, n] = size(A);
if m ~= n
    error('Matrix must be square');
end

isDominant = true;

```

```

for i = 1:n
    row = A(i,:);
    diag_element = abs(row(i));
    sum_others = sum(abs(row)) - diag_element;

    if strcmpi(dominance_type, 'strict')
        if diag_element <= sum_others
            isDominant = false;
            return;
        end
    elseif strcmpi(dominance_type, 'weak')
        if diag_element < sum_others
            isDominant = false;
            return;
        end
    end
end
end

%% ex 06
function valid_moves = knight_moves(position)

if any(position <= 0) || any(position > 8) || numel(position) ~= 2
    error('Invalid position');
end

move_offsets = [ 2, 1; 1, 2; -1, 2; -2, 1;
                -2, -1; -1, -2; 1, -2; 2, -1];

new_positions = position + move_offsets;

is_valid = all(new_positions >= 1 & new_positions <= 8, 2);
valid_moves = new_positions(is_valid, :);
end

%% ex 07
function res = repeat_elem_v2(n,s)

if nargin < 2
    s = 1;
end

res = [];
for i = s:n
    for j = 1:i
        res = [res, i];
    end
end

```

```
end  
end
```