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Assignment 3
Zagrodzki; CSCI 1320-112

Assignment 3 – Vector and Matrices

Task 1) Column Vector Generation

- a) Colon Operator
 - a. `colvec1 = (-18:-12)';`
 - b. `colvec2 = (8:4:16)';`
 - c. `colvec3 = (16:-6:4)';`
- b) Linspace
 - a. `colvec1 = linspace(-18,-12,7)';`
 - b. `colvec2 = linspace(8,16,3)';`
 - c. `colvec3 = linspace(16,4,3)';`

Task 2) Efficient Matrix Generation

```
>> M =      13      10      7
           1       5       9
           30      20      10
           5       15      25
```

```
>> M = [linspace(13,7,3);linspace(1,9,3);linspace(30,10,3);linspace(5,25,3)];
```

- A) `>> m1 = M(4,3);`
- B) `>> m2 = M(:,3);`
- C) `>> m3 = M([1:2]+[5:6]+[9:10]]);`

Task 3) Find and Eliminate

```
>> vec = [-11, 5, 3, 2, -18, 4, -5, 5, -66];
```

- A) Find function

```
>> vec = vec(find(vec>0));
```
- B) Logical Vectors Method

```
>> vec = vec(vec>0);
```

Task 4) Transpose Matrix

```
>> x = [1 2 3; 1 2 1; 3 5 1];
```

Transposemat function

```
function y = transposemat(x);  
%transposemat(x) returns the transpose of matrix x  
r1 = [x(1,1);x(1,2);x(1,3)];  
r2 = [x(2,1);x(2,2);x(3,3)];  
r3 = [x(3,1);x(3,2);x(3,3)];  
y = [r1,r2,r3];  
end
```

```
>> transposemat([1 2 3; 1 2 1; 3 5 1])
```

ans =

```
1    1    3
```

```
2    2    5
```

```
3    1    1
```

```
>> disp(transposemat([1 2 3; 1 2 1; 3 5 1]))
```

```
1    1    3
```

```
2    2    5
```

```
3    1    1
```

Task 5) Easter Sunday

```
% Henry Meyerson
% Easter Sunday Calculator
% Assignment 3 - Task 4

% Set Year
y = input('Please enter the year: ');

% Math
% Step 2
a = mod(y,19);
% Step 3
b = fix(y/100);
c = mod(y,100);
% Step 4
d = fix(b/4);
e = mod(b,4);
% Step 5
g = fix((8 * b + 13)/25);
% Step 6
h = mod(19 * a + b - d - g + 15, 30);
% Step 7
j = fix(c/4);
k = mod(c,4);
% Step 8
m = fix((a+11*h)/319);
% Step 9
r = mod((2 * e + 2 * j - k - h + m + 32),7);
% Step 10
n = fix((h - m + r + 90)/25);
% Step 11
p = mod((h - m + r + n + 19),32);

% Print Out
fprintf('In %d, Easter Sunday fell on %d/%d.\n',y,n,p)
```

Task 6) throwBall_func.m

```
function p = throwBall_func(v, a, M)
h = 1.5; %Starting height of 1.5 meters
g = 9.8; %Gravity Defines at 9.8 m/s/s
t = linspace(0,M,10000);
y = h + (v * sin(a * pi/180) * t) - (0.5 * g * t.^2);
p = ~isempty(find(y<0));
end
```