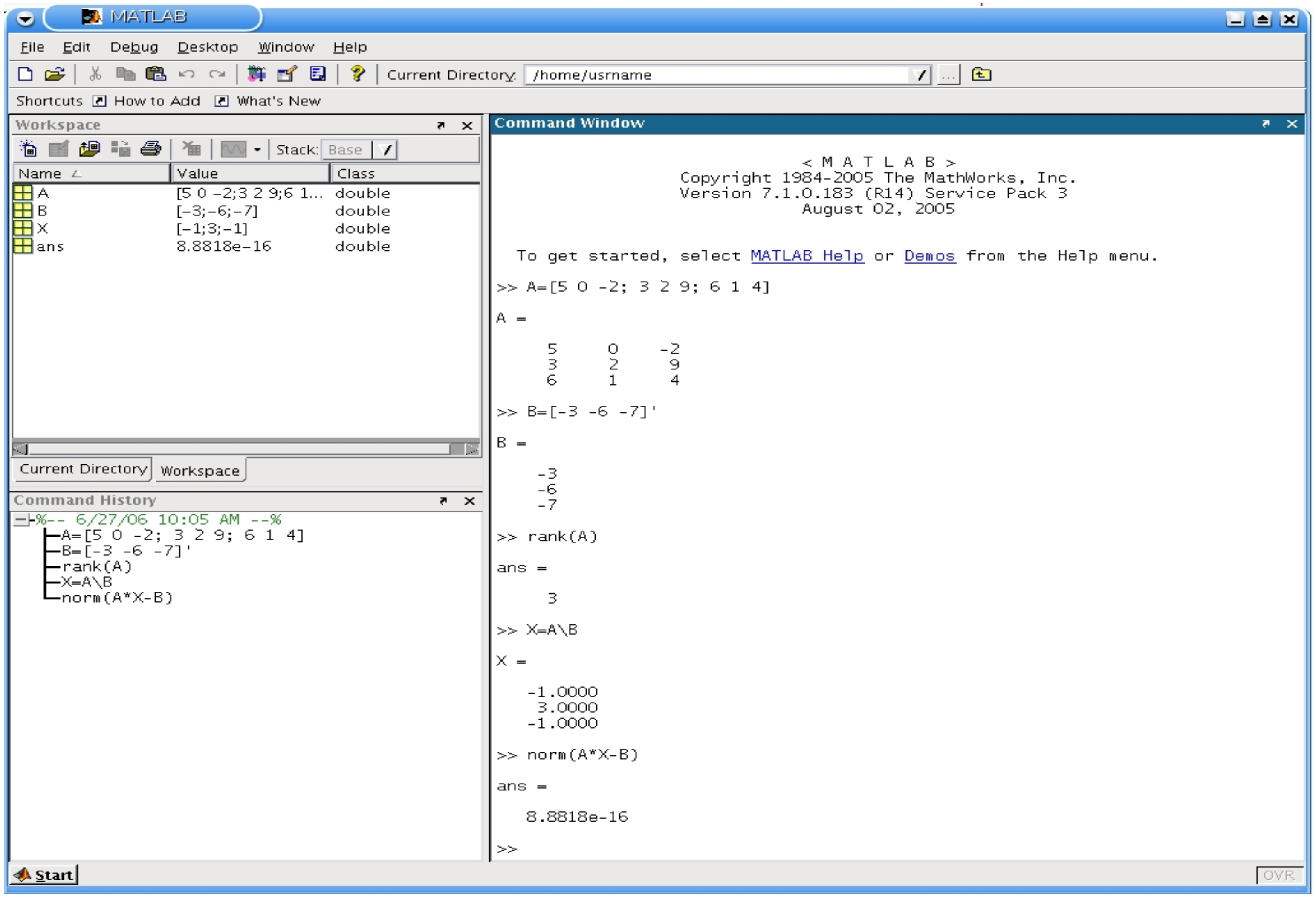
Basic Operations

Practical 1

1. Open a terminal (shell)
2. Type matlab on terminal



Type following MATLAB keywords

Pi
PI
Pi
True
true
false
i
J^2
j^2

Type following MATLAB keywords

```
Pi
PI
Pi
True
true
false
i
J^2
j^2
```

```
true + false
true * false
sin(pi)
atan(1)
exp(i*pi)
exp(i*pi/2)
2.3+0.6i + 4.5j
2+i3 + 3
4e4+30e2+2e1+1
conj(1+2i)
real(1+2i)
imag(1+2i)
```

Type following MATLAB keywords

Pi	true + false	abs(1+2i)
PI	true * false	(1+2i)*(conj(1+2i))
Pi	sin(pi)	x = 22/7
True	atan(1)	x = sin(x/2)+cos(x)
true	exp(i*pi)	y = 169;
false	exp(i*pi/2)	z = sqrt(169);
i	2.3+0.6i + 4.5j	x = y+z; y=x-y;
J^2	2+i3 + 3	disp(y), disp(z)
j^2	4e4+30e2+2e1+1	
	conj(1+2i)	
	real(1+2i)	
	imag(1+2i)	

Type following MATLAB keywords

Pi
PI
Pi
True
true
false
i
J^2
j^2

ans: output variable automatically created by MATLAB

clear : delete variables and functions from memory

clc : clean command window

Create variables manually

Create following matrices

$$a = \begin{bmatrix} 1 & 4 & 5 & 1 & 1 & 2 \end{bmatrix}$$

$$d = \begin{bmatrix} 4 & 1 & 4 & 5 & 7 \\ 2 & 2 & 3 & 3 & 5 \\ 1 & 5 & 5 & 6 & 9 \\ 1 & 1 & 3 & 4 & 3 \end{bmatrix}$$

$$b = \begin{bmatrix} 5 \\ 6 \\ 3 \\ 7 \\ 1 \\ 2 \end{bmatrix}$$

$$c = \begin{bmatrix} 1 & 3 & 4 \\ 2 & 6 & 8 \\ 3 & 2 & 5 \end{bmatrix}$$

$$e = \begin{bmatrix} 3 & 4 & 4 \\ 1 & 2 & 1 \\ 1 & 5 & 2 \\ 2 & 4 & 3 \\ 5 & 2 & 2 \end{bmatrix}$$

$$f = \begin{bmatrix} 0 & 3 & 4 & 2 \end{bmatrix}$$

Perform following operations

```
a+a
b+b
a+f
a+b
disp(b')
a-b'
a*b
a.*b'
```

Perform following operations

```
a+a
b+b
a+f
a+b
disp(b')
a-b'
a*b
a.*b'
```

```
k=6;
k*a
a*k
k+a
k/a
a/k
length(a)
length(b)
a(1)
a(length(a))
a(end)
```

Perform following operations

```
a+a
b+b
a+f
a+b
disp(b')
a-b'
a*b
a.*b'
```

```
k=6;
k*a
a*k
k+a
k/a
a/k
length(a)
length(b)
a(1)
a(length(a))
a(end)
```

```
a(1:end)
a(3:4)
b(2)+a(3)
a(1:2)+b(1:2)
a(1:2)+b(1:2)'
max(a)
min(b)
ans
b(4:5)=a(3:4)
a(1:3)=b(2:3)
a(1)=[]
f(end)
f(end)=[]
end
```

```
c(2,3)
c(1,3)
c(1,:)
c(3,:)
c(2:3,:)
c(:,1:2)
c(1:2,2:3)
d(3:4, 4)
d(1:2, 3:4)
d(1:4,2:5)
d(end+1,:)=[1 4 3 5 0]
d(3,:)=[]
d(:,2)=[0 0 3]
d(1:2,1)=[0; 4]
d(1:2, 2)=[8 1]
```

```
size(d)
det(c)
inv(c)
det( d(:,1:end-1))
inv( d(:,1:end-1))
d*e
c^2
c.^2
diag(d)
c(diag(c) )=d( diag(d(1:3,1:3)))
d(:)
length(d(:))
diag([ 1 0 3 6 2 7])
```

```
eye(3,2)
eye(4,3)
eye(1,3)
zeros(3,3)
rand(2,4)
rand(4,4)*100
ones(3,3)
ones(1,3)
ones(3,3)+eye(3,3)
```

```
a.*a
a./a
d*e
rank(d)
```

Solving system of linear equations

$$6x + 5y + 3z = 4 \quad \text{---------} \; (1)$$

$$2x + 4y + 7z = 2.3 \quad \text{---------} \; (2)$$

$$9x + 2y + 5z = 6.7 \quad \text{---------} \; (3)$$

Solving system of linear equations

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$$2x + 4y + 7z = 2.3 \qquad \text{---------} \ (2)$$

$$9x + 2y + 5z = 6.7 \qquad \text{---------} \ (3)$$

```
A=[6 5 3; 2 4 7; 9 2 5];
B=[4;2.3;6.7];
```

Solving system of linear equations

$$6x + 5y + 3z = 4 \qquad \text{---------} \ (1)$$

$$2x + 4y + 7z = 2.3 \qquad \text{---------} \ (2)$$

$$9x + 2y + 5z = 6.7 \qquad \text{---------} \ (3)$$

```
A=[6  5  3; 2 4  7; 9  2  5];
B=[4; 2.3; 6.7];

X= inv(A)*B

X = A\B
```

```
6*X(1)+5*X(2)+3*X(3)
```

Create Trigonometric Table

```
x = -pi: pi/10:pi;

[ x       sin(x)       cos(x)    tan(x)]

x=x';

[ x       sin(x)       cos(x)    tan(x) ]
```

Create Trigonometric Table

```
x = -pi: pi/10:pi;

[ x       sin(x)       cos(x)    tan(x)]

x=x';

[ x       sin(x)       cos(x)    tan(x) ]
```

```
x = (-pi: pi/100:pi)';

[ x       sin(x)       cos(x)    tan(x) ]

plot(x, sin(x) ), plot(x, cos(x)), plot(x, tan(x))
```

```
plot( x, exp(x), 'g' )

figure

plot(x, sin(x), 'r')

 hold on

plot(x, cos(x), 'k')
```

Compute Vector & scalar products using MATLAB

$$\vec{A} = 12.74\hat{\imath} + 0 \cdot 3\hat{\jmath} + 5.1\hat{k}$$

$$\vec{B} = 2.3\hat{\imath} + 4 \cdot 4\hat{\jmath} + 6\hat{k}$$

$$\vec{C} = 52.4\hat{\imath} + 8.1\hat{k}$$

$$\vec{D} = 0.3\hat{\imath} + 6 \cdot 9\hat{\jmath}$$