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## Sheet (4)

[1] write the output of the given MATLAB commands:

- (1)(a)  $C=[1\ 2\ 3; 4\ 5\ 6; 7\ 8\ 9]$ ,  
(b)  $\text{size}(C)$ ,  $\text{size}(C,1)$ ,  $\text{size}(C,2)$   
(c)  $C(2,4)=16$ ,  $C(2,2:4)=[20\ 30\ 40]$ ,  
(d)  $C(3,1)=25$ ,  $C(1:2,1:3)=15$ ,  
(e)  $C(3,:)=[]$ ,  $C(:,4)=[]$ ,  
(f)  $C(1,3)$ ,  $C(2,1:3)$ ,  $C(2,[1\ 3])$ ,  
(g)  $C(2,\text{end})$ ,  $C(\text{end},2)$ ,  
(h)  $D=\text{max}(C)$ ,  $\text{max}(D)$ ,  
(i)  $E=\text{min}(C)$ ,  $\text{min}(E)$ ,  
(j)  $F=\text{sum}(C)$ ,  $\text{sum}(F)$ ,  
(k)  $G=\text{prod}(C)$ ,  $\text{prod}(G)$ ,  
(l)  $a=\text{randint}(3,3,[4\ 4])$ ,  
(m)  $a1=\text{diag}(a)$ ,  $a2=\text{sum}(\text{diag}(a))$ ,  $a3=\text{prod}(\text{diag}(a))$
- (2)(a)  $g=[1\ 2\ 3\ 4; 5\ 6\ 7\ 8; 9\ 10\ 11\ 12]$ ,  
(b)  $g-2$ ,  $2*g-1$   
(c)  $C(2,4)=16$ ,  $C(2,2:4)=[20\ 30\ 40]$ ,  
(d)  $C(3,1)=25$ ,  $C(1:2,1:3)=15$ ,  
(e)  $C(3,:)=[]$ ,  $C(:,4)=[]$ ,  
(f)  $C(1,3)$ ,  $C(2,1:3)$ ,

(3)(a)  $b1 = [1 \ 2 \ 3; 4 \ 5 \ 6; 7 \ 8 \ 9]$ ,

(b)  $b2 = [1 \ 1 \ 1; 2 \ 2 \ 2; 3 \ 3 \ 3]$ ,

(c)  $c1 = b1 + b2$ ,  $c2 = b1 - b2$ ,  $c3 = 2 * b1 - b2$ ,

(d)  $c4 = b1 .* b2$ ,  $c5 = b1 * b2$ ,

(e)  $c6 = b1 ./ b2$ ,  $c7 = b1 .\ b2$ ,

(f)  $b3 = [10 \ 20 \ 40; 40 \ 50 \ 30; 60 \ 30 \ 50]$ ;  $c8 = b1 / b3$ ,  $c9 = b3 \setminus b1$ ,

(g)  $c_{10} = b1.^2$ ,  $c_{11} = b2.^{-1}$ ,  $c_{12} = 1 ./ b2$ ,

(h)  $c_{13} = 2.^{b1}$ ,  $c_{14} = b1.^{b2}$ ,  $c_{15} = b1.^{(b2-1)}$ ,

(i)  $A = [1 \ 7 \ 3; 4 \ 9 \ 6; 7 \ 8 \ 9]$ ,  $\text{inv}(A)$ ,

(4)(a)  $\text{ones}(3)$ ,  $\text{zeros}(3,2)$

(b)  $a = [1 \ 1 \ 1 \ 1; 2 \ 2 \ 2 \ 2; 3 \ 3 \ 3 \ 3]$ ,  $\text{size}(a)$ ,  $\text{ones}(\text{size}(a))$

(c)  $\text{eye}(4)$ ,  $\text{eye}(2,4)$ ,  $\text{eye}(4,2)$

(d)  $\text{rand}(3)$ ,  $\text{rand}(1, 4)$ ,  $b = \text{eye}(3)$ ,  $\text{rand}(\text{size}(b))$ ,

(e)  $\text{randint}(3)$ ,  $\text{randint}(1, 4)$ ,  $\text{randint}(1, 4, [5 \ 7])$ ,

(5)(a)  $a = 1:4$ ,  $\text{diag}(a)$ ,  $\text{diag}(a,1)$ ,  $\text{diag}(a,-2)$

(b)  $d = \pi$ ,  $d * \text{ones}(3,4)$ ,  $d + \text{zeros}(3,4)$ ,  $d(\text{ones}(3,4))$ ,  $\text{repmat}(d, 3, 4)$

(6)(a)  $A = [1 \ 2 \ 3; 4 \ 5 \ 6; 7 \ 8 \ 9]$ ,  $A(3,3) = 0$ ,  $A(2,6) = 1$ ,  $A(:,4) = 4$

(b)  $A = [1 \ 2 \ 3; 4 \ 5 \ 6; 7 \ 8 \ 9]$ ;  $B = A(3:-1:1, 1:3)$ ,  $B = A(3:-1:1, :)$ ,

(c)  $C = [A \ B(:, [1 \ 3])]$ ,  $B1 = A(1:2, 2:3)$ ,

(d)  $c = [1 \ 3]$ ,  $B2 = A(c, c)$ ,  $B3 = A(:)$ ,  $B4 = B3.'$

(e)  $b = A$ ;  $b(:, 2) = []$ ,  $b = b.'$ ,  $b(2, :) = []$ ,  $A(2, :) = b$ ,  $B = A(:, [2 \ 2 \ 2 \ 2])$ ,

$b(3:4, :) = A(2:3, :)$

(f)  $A = [1 \ 2 \ 3; 4 \ 5 \ 6; 7 \ 8 \ 9]$ ,  $G(1:6) = A(:, 2:3)$

(g)  $H = \text{ones}(6, 1)$ ,  $H(:) = A(:, 2:3)$

(h)  $A(2,:)=0$ ,  $A(2,:)=[0\ 0\ 0]$

(7)(a)  $A=[1\ 2\ 3; 4\ 5\ 6; 7\ 8\ 9; 10\ 11\ 12]$ ,  $r=[3\ 2\ 1]$ ,

(b)  $A_r=[A(:,1)-r(1)\ A(:,2)-r(2)\ A(:,3)-r(3)]$

(c)  $R=r([1\ 1\ 1\ 1],:)$ ,  $A_r=A-R$

(d)  $R=r(\text{ones}(\text{size}(A,1),1),:)$

(e)  $R=\text{repmat}(r,\text{size}(A,1),1)$

(8)(a)  $D=[1\ 2\ 3\ 4; 5\ 6\ 7\ 8; 9\ 10\ 11\ 12]$ ,  $D(2)$ ,  $D(5)$ ,

(b)  $D(\text{end})$ ,  $D(4:7)$ ,

(c)  $\text{sub2ind}(\text{size}(D),2,4)$

(d)  $[r,c]=\text{ind2sub}(\text{size}(D),11)$

(9)(a)  $x=-3:3$ ,  $\text{abs}(x)>1$ ,

(b)  $y=x(\text{abs}(x)>1)$ ,

(c)  $y=x(\text{logical}([1\ 1\ 0\ 0\ 0\ 1\ 1]))$

(d)  $B=[5\ -3; 2\ -4]$ ,  $x=\text{abs}(B)>2$ ,  $y=B(x)$

(10)(a)  $x=-3:3$ ,  $k=\text{find}(\text{abs}(x)>1)$ ,

(b)  $y=x(k)$ ,  $y=x(\text{abs}(x)>1)$ ,

(c)  $A=[1\ 2\ 3; 4\ 5\ 6; 7\ 8\ 9]$ ,  $[i,j]=\text{find}(A>5)$

(11)(a)  $A=[1\ 2\ 3\ 4; 5\ 6\ 7\ 8]$ ,  $s=\text{size}(A)$ ,  $[r,c]=\text{size}(A)$ ,

(b)  $r=\text{size}(A,1)$ ,  $c=\text{size}(A,2)$ ,  $\text{length}(A)$ ,

(c)  $B=\text{pi}:0.01:2*\text{pi}$ ;  $\text{size}(B)$ ,  $\text{length}(B)$ ,  $\text{size}([])$ ,

(12)(a)  $A=[1\ 2\ 3; 4\ 5\ 6; 7\ 8\ 9]$ ,

(b)  $\text{flipud}(A)$ ,  $\text{fliplr}(A)$ ,

(c) `rot90(A)`, `rot90(A,2)`,

(13)(a) `B=1:12`, `reshape(B,2,6)`, `reshape(B,3,4)`, `reshape(A,1,9)`,

(14)(a) `A=[1 2 3; 4 5 6; 7 8 9]`, `diag(A)`, `diag(ans)`,

(b) `triu(A)`, `tril(A)`, `tril(A)-diag(diag(A))`

(c) `a=[1 2; 3 4]`, `b=[0 1; -1 0]`, `repmat(a,1,3)`, `repmat(b,2,2)`

[2] What are the functions of the following MATLAB commands:

(a) `size`, `length`

(b) `max`, `min`, `sum`, `prod`, `diag`

(c) `ones`, `zeros`, `eye`

(d) `sub2ind`, `ind2sub`, `logical`

(e) `repmat`, `find`

(f) `flipud`, `fliplr`

(g) `rot90`, `rot90`

(h) `reshape`, `triu`, `tril`