# UNIVERSITY OF ASIA PACIFIC
## CSE - 4.1

18101009
HASAN TAHSIN RAFSAN
A SECTION          ROLL : 9

CLASS TEST 2
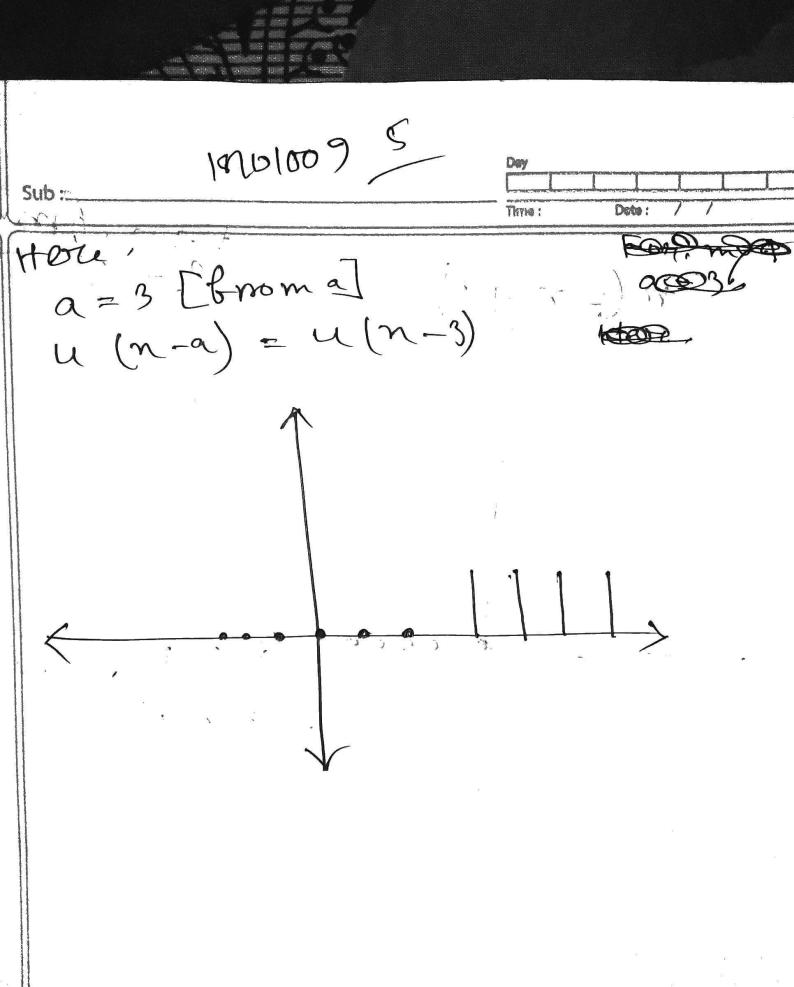
CSE - 401

29 AUGUST 2021

18101009

Ans: Q1

① Here.

$a = 1d \bmod 3 + 1 = 3$

$b = 1d \bmod 4 + 1 = 2$

$c = 1d \bmod 5 + 1 = 5$

$d = 1d \bmod 6 + 1 = 6$.

~~so, eadaset cauil be~~

we consider $x$ as $x_1$ & $y$ as $x_2$

so, the dataset will be.

| $x_1$ | 3 | 5 | 5 | 2 |
|-------|---|---|---|---|
| $x_2$ | 4 | 2 | 6 | 6 |

Now, calculating Mean.

$$\overline{x_1} = \frac{1}{4}(3+5+5+2) = 3.75$$

$$\overline{x_2} = \frac{1}{4}(4+2+6+6) = 4.5$$

Covariance Matrix.

$$Cov(x_1 x_1) = \frac{1}{N-1} \sum_{k=1}^{N} (x_{1k} - \overline{x_1})^2$$

$$= \frac{1}{4-1} \left\{ (3-3.75)^2 + (5-3.75)^2 \right. $$
$$\left. + (5-3.75)^2 + (2-3.75)^2 \right\}$$

$$= \frac{1}{3} \left\{ \frac{27}{4} \right\} = \frac{9}{4} = 2.25$$

$$Cov(x_1 x_2) = \frac{1}{N-1} \sum_{k=1}^{N} (x_{1k} - \overline{x_1})(x_{2k} - \overline{x_2})$$

$$= \frac{1}{3} \left\{ (3-3.75)(4-4.5) + (5-3.75)(2-4.5) \right.$$
$$\left. + (5-3.75)(6-4.5) + (2-3.75)(6-4.5) \right\}$$

$$= \frac{1}{3} \left\{ -\frac{7}{2} \right\}$$

$$= -\frac{7}{6} = -1.1667$$

Here
$$-1.1666\ldots$$
$$\simeq 1.1.1667$$

$$cov(x_2, x_1) = \frac{1}{N-1} \sum_{k=1}^{N} (x_{2k} - \bar{X}_2)(x_{1k} - \bar{X}_1)$$

$$= -1.1667$$

$$cov(x_2, x_2) = \frac{1}{N-1} \sum_{k=1}^{N} (x_{2k} - \bar{X}_2)$$

$$= \frac{1}{3} \left\{ (4 - 4.5) + (2 - 4.5) + (6 - 4.5) \right.$$
$$\left. + (6 - 4.5) \right\}$$

$$= \frac{1}{3} \{11\} = \frac{11}{3} = 3.667$$

Here
$$3.666\ldots$$
$$\simeq 3.667$$

18|6|60 9

Sub : _____

So, Covariance
Matrix , e

$$= \begin{bmatrix} cov.(x_1, x_1) & cov(x_1, x_2) \\ cov(x_2, x_1) & cov(x_2, x_2) \end{bmatrix}$$

$$= \begin{bmatrix} 2.25 & -1.1667 \\ -1.1667 & 3.667 \end{bmatrix}$$

(Ans)

Ans: 2

Here:

① $u(n-a)$

⑪ $v(-n+c)$

$u(n)$, unit step signal

$$u(n) = \begin{cases} 1 & , n \geq 0 \\ 0 & , n < 0 \end{cases}$$

$v(n)$ unit ramp signal

$$v(n) = \begin{cases} n & , n \geq 0 \\ 0 & , n < 0 \end{cases}$$

Here'

$$a = 3 \quad [\text{from } a]$$
$$u(n-a) = u(n-3)$$

Sub : _____

Day :

Time : _____ Date :

Here, from (a)

$$C = 5$$

$$x(-x+c)$$