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CSIT375 Artificial Intelligence for Cybersecurity **Assignment Q1**

1.1

CPU USAGE

$$\text{Mean} = (20 + 25 + 22 + 23 + 21 + 45 + 48 + 50 + 46 + 47) \div 10$$
$$= 34.7$$

$$\text{Variance} = \left[(20-34.7)^2 + (25-34.7)^2 + (22-34.7)^2 + (23-34.7)^2 + (21-34.7)^2 + (45-34.7)^2 + (48-34.7)^2 + (50-34.7)^2 + (46-34.7)^2 + (47-34.7)^2\right] \div 10$$
$$= 159.209$$

MEMORY USAGE

$$\text{Mean} = (30 + 35 + 31 + 32 + 33 + 80 + 85 + 90 + 83 + 87) \div 10$$
$$= 58.6$$
$$\text{Variance} = \left[(30-58.6)^2 + (35-58.6)^2 + (31-58.6)^2 + (32-58.6)^2 + (33-58.6)^2 + (80-58.6)^2 + (85-58.6)^2 + (90-58.6)^2 + (83-58.6)^2 + (87-58.6)^2\right] \div 10$$
$$= 704.24$$

1.2

$$\text{Gaussian probability} = \frac{1}{\sqrt{2\pi} \times \text{variance}} \times e\left[-\frac{(\text{value} - \text{mean})^2}{2 \times (\text{variance})^2}\right]$$

if probability < 0.0001, value is anomaly

11 hour

if CPU usage $= 54$,

$$\text{Gaussian probability} = \frac{1}{\sqrt{2\pi} \times 159.29} \times e\left[-\frac{(54-34.7)^2}{2 \times (159.29)^2}\right]$$
$$= 0.02486$$

If memory usage $= 78$

$$\text{Gaussian probability} = \frac{1}{\sqrt{2\pi} \times 704.24} \times e\left[-\frac{(78-58.6)^2}{2 \times (704.24)^2}\right]$$
$$= 0.00056$$

12 hour

if CPU usage $= 15$

$$\text{Gaussian probability} = \frac{1}{\sqrt{2\pi} \times 159.29} \times e\left[-\frac{(15-34.7)^2}{2 \times (159.29)^2}\right]$$
$$= 0.00248$$

If memory usage $= 35$

$$\text{Gaussian probability} = \frac{1}{\sqrt{2\pi} \times 704.24} \times e\left[-\frac{(35-58.6)^2}{2 \times (704.29)^2}\right]$$
$$= 0.00056$$

Since all gaussian probability of all data points are more than threshold 0.0001, all data points are normal