SCM222-0765/2025_ANGELA MWERU_GROUP 4

CAT 2 ANSWERS

1. a) A computer is an integrated system that coordinates financial transactions and clinical events by processing storing and transmitting data

b) A program is a set of instructions implemented as a dynamic control logic that directs a computer to process transactional and clinical data to produce meaningful result

c) Information is raw transactional and clinical data that has been processed to provide meaning to the user

d) An end user is a participant whose interactions with programs and data influence how the system processes transactions and clinical informations

e) Main memory is a temporary storage where financial and clinical data interact with programs in real time

INPUT(END USERS)

↓

PROCESSING(MAIN MEMORY &PROGRAM)

STORAGE (HOSPITAL DATA SOURCE AND PORTFOLIO DATA BASE)

↓

OUTPUT

2. a) Computer generations represent ontological shifts in how computing interacts with reality.Early generations were deterministic and rule-based, processing instructions sequentially.
Later generations introduced multiprogramming, personal computing and eventually AI, enabling probabilistic simulation, deep learning and adaptive computation.
In the digitized financial–biomedical ecosystem, these shifts allow systems to predict outcomes, adapt to changing transactional and clinical data and produce emergent intelligent behavior.

3.

NETWORK	LATENCY	BOTTLENECKS	CASCADING FAILURES

LAN	Low(few hops)	Rare	Unlikely
MAN	Medium	Possible at traffic points	Moderate
WAN	High(high hops)	Common at routers/ISPs	High

EFFECTS ON BUSINESS OPERATIONS

>LAN

a)High productivity for on-prem operations-Local storage and servers reduce delays ,allowing real time processing of transactions and clinical data

b)Fast local apps-Applications hosted locally on the LAN or on premises server run very quickly

c)Failures are localized-Problems in LAN rarely cascade system wide ,making operations more reliable and predictable

>MAN

a)Outrage impacts multiple sites-If a MAN link or node fails ,it can affect many connected branches simultaneously unlike LAN failures which are localized hence business operations can stall across multiple locations

b)Dependency on carrier resilience-they rely on how resilient telecom providers or ISPs are .If the carrier experiences failure ,hospitals and financial offices across cities cannot exchange data

>WAN

a)Latency sensitive apps degrade first-Applications that require real time response are affected before non-critical apps when network performance drops

b)Delayed performance

4.a) Factors for acquiring high volume systems

- **Processing power(handles many transactions)**
- **Main memory capacity(supports high -frequency processing**
- **Storage speed and capacity**
- **Network bandwidth and low latency**

- **Reliability and scalability**

b) Convert 97 to binary

97/2=48 r 1

48/2=24 r 0

24/2=12 r0

12/2=6 r 0

6/2=3 r 0

3/2=1 r 1

1/2=0 r 1

97(base 10)=1100001(base 2)

c) 10000001(base 2) to decimal

1*2^7 +1*2^0=128+1

=129

d) Implications for high frequency simulation

- **Efficient binary representation-enables simulations to run fast enough for real time decision making**
- **Large main memory-to maintain continuous processing**
- **High processing power-to avoid latency and computational delays**
- **Continuous operation -the system must be robust to prevent downtime and cascading failures.**

5.

DEVICE	FUNCTION	INTERFACE ROLE	REAL WORLD IMPACT
Laser printer	Prints processed information	Output interface	• Makes digital data tangible • Reduces interpretation errors • Communica

			tes decisions to users
OMR	**Reads marked forms**	**Input interface**	• **Converts stochastic marks into structured data** • **Reduces manual entry errors**
MICR	**Reads bank cheques**	**Input interface**	• **Converts physical cheques into machine readable data** • **Handles stochastic variability in handwriting or printing**