MIDTERM CHEAT SHEET: Updates to Information Systems (IS)

□ 1. INFORMATION SYSTEM (IS)

 Key Concept
• Information System (IS)
• Collects data
• Processes data
• Stores data
• Produces useful information
• Purpose: Help people do their jobs better

 Data vs Information
• Data = raw facts (e.g., numbers, logs)
• Information = processed data with meaning

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 Three Dimensions of IS

Dimension Components Example
Organization People, processes, rules Enrollment system
Management Decision-making, planning Reports
Technology Hardware, software, DB, network Systems

⚠ Key Rule:

IS = People + Process + Technology (ALL required)

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 Why IS is Important
• Faster work
• Fewer errors
• Better decisions
• Competitive advantage

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 Complementary Assets
• Trained people
• Updated processes
• Good management

⚠ Not just technology

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 Analogy
• Technology = Motorcycle
• People = Driver
• Process = Traffic rules

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✅ Summary
• IS ≠ technology only
• Integration of 3 dimensions is required

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✒ 2. CLOUD COMPUTING

 Core Models

Model Meaning Key Feature
IaaS Infrastructure Full control (servers, storage)
PaaS Platform Build apps without managing infra
SaaS Software Ready-to-use apps

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⚙ IaaS

Components
• Virtual machines
• Storage (block, file, object)
• Networking
• Containers

Use Cases
• Development/testing
• Hosting
• Backup & recovery
• Big data

Advantages
• Pay-as-you-go
• Scalable
• Flexible

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 PaaS
• Full dev environment
• Pre-configured tools
• Upload code → deploy instantly

Benefits
• Faster development
• Less maintenance
• Built-in scalability

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 SaaS

Examples
• CRM
• Email
• Meetings

Features
• Subscription-based
• No installation
• Auto updates

Accessibility
• Must follow:
• ADA
• WCAG

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✒ Cloud Deployment Models

Type Description
Public Shared, scalable, provider-managed
Private Single organization, secure
Hybrid Mix of public + private

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 Security Comparison
• Private: Maximum control
• Public: Shared responsibility
• Hybrid: Balanced

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 Virtualization
• Uses hypervisor
• Creates Virtual Machines (VMs)

Benefits
• Better hardware use
• Lower cost
• Scalability

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 Trends
• Serverless computing
• Edge computing + IoT
• AI/ML cloud
• Quantum readiness

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✅ Summary
• Cloud = scalable, flexible IT delivery
• Virtualization is foundation

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□ 3. BIG DATA & DATA MANAGEMENT

□ What is Big Data?
• Massive, complex datasets
• Cannot be handled by traditional tools

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□ 5 V's of Big Data
• Volume – amount
• Velocity – speed
• Variety – types
• Veracity – accuracy
• Value – usefulness

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□ Sources
• Social media
• IoT devices
• Transactions
• Web logs

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□ Big Data Analytics
• Analyze large datasets
• Find patterns
• Support decisions

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□ Types of Analytics

Type	Question
Descriptive	What happened?
Diagnostic	Why happened?
Predictive	What will happen?
Prescriptive	What to do?

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□ Real-Life Applications
• Recommendations
• Fraud detection
• Traffic systems
• Healthcare predictions

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✅ Summary
• Big data = insight-driven decisions
• Analytics improves performance

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□ 4. FILE SYSTEM vs DBMS

□ Traditional File System

Features
• Separate files
• No relationships
• Manual handling

Problems
• Data redundancy
• Data inconsistency

• Limited sharing
• Security issues

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□ DBMS (Database Management System)

Definition
• Software to manage structured data

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⚙ Core Functions
• Data definition
• Storage & retrieval
• CRUD operations
• Security
• Backup & recovery

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□ Benefits
• Reduced redundancy
• Data consistency
• Strong security
• Centralized storage
• Easy sharing

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⚖ Comparison

Feature	File System	DBMS
Structure	None	Tables
Redundancy	High	Low
Security	Weak	Strong
Sharing	Difficult	Easy
Consistency	Manual	Automatic

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✅ Summary
• DBMS solves file system limitations
• Provides structured, secure data management

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□ 5. NoSQL DATABASES

□ Definition
• Non-relational databases
• Flexible schema

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⚙ Features
• Schema-less
• Horizontal scaling
• High performance
• Eventual consistency

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□ Types

Type	Description
Document	JSON/XML
Key-Value	Simple pairs
Column	Column storage
Graph	Relationships

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□ Use Cases
• Social media
• Real-time apps

• Big data
• E-commerce

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⚖️ SQL vs NoSQL

Feature SQL NoSQL
Structure Fixed Flexible
Scaling Vertical Horizontal
Data Type Structured Unstructured
Use Banking Social media

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✅ Summary
• SQL = structured, reliable
• NoSQL = flexible, scalable

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□ FINAL KEY TAKEAWAYS
• IS = Integration of people + process + technology
• Cloud = on-demand, scalable computing
• Virtualization = core of cloud
• Big Data = data-driven decisions
• DBMS = structured, secure data handling
• NoSQL = flexible + scalable databases

AIS Reviewer