Big Data L2: True/False Questions

#	Question	Answer
51	A large array generated randomly can still be considered "data" in the course.	True
52	A transistor controls current flow and forms the basic building block of CPUs.	True
53	CPU speed is determined solely by the number of transistors it contains.	False
54	The CPU clock synchronizes operations billions of times per second.	True
55	In computers, reducing physical distance between components can improve speed.	True
56	File systems organize data into hierarchical structures of directories and files.	True
57	File systems inherently provide strong support for complex queries across datasets.	False
58	In a file system, persistence means that data remains even after program termination.	True
59	Every analysis involving files must be fully rewritten if the data structure slightly changes.	True
60	Relational databases were designed to completely replace file systems.	False
61	Hadoop is built on top of a distributed file system.	True
62	File systems are sufficient for managing highly complex, multi-relational data.	False
63	A relational database organizes data into tables consisting of rows (tuples) and columns (attributes).	True
64	In the relational model, rows (tuples) are unique and unordered.	True
65	In the relational model, order matters: $A \times B$ is the same as $B \times A$.	False
66	In relational databases, a schema enforces the structure and types of stored data.	True
67	Schemas prevent any bad or inconsistent data from ever being entered into a database.	False
68	It is common to use primary keys to enforce uniqueness in database tables.	True
69	A foreign key links a record in one table to a record in another table.	True
70	Normalization increases redundancy within database tables.	False
71	Denormalization is useful when optimizing databases for faster reading.	True
72	Structured Query Language (SQL) is a declarative language.	True
73	SQL commands specify exactly how databases should retrieve data, step-by-step.	False
74	SELECT queries in SQL always produce another relation (table).	True

#	Question	Answer
75	A CROSS JOIN between two tables matches rows based on common attributes.	False
76	In an INNER JOIN, only matching rows from both tables are included.	True
77	In a LEFT OUTER JOIN, unmatched rows from the left table are still retained.	True
78	Aggregation functions in SQL like AVG, SUM, and COUNT are used to summarize groups of rows.	True
79	GROUP BY applies to the output of SQL aggregation, not the input.	False
80	HAVING clauses in SQL are used to filter grouped results after aggregation.	True
81	Indexes in a database can greatly speed up read queries.	True
82	Adding an index always speeds up INSERT and UPDATE operations.	False
83	Composite indexes (indexes over multiple columns) take up less space than single-column indexes.	False
84	Good candidates for indexing are columns that are read frequently and updated rarely.	True
85	In the CAP theorem, a distributed system can guarantee consistency, availability, and partition tolerance simultaneously.	False
86	Atomicity ensures that database transactions either complete fully or not at all.	True
87	Durability in databases means that committed transactions remain intact even after a crash.	True
88	Isolation ensures that concurrently running transactions do not affect each other's outcomes.	True
89	Consistency guarantees that every database transaction moves the database from one valid state to another.	True
90	In the classic SQL bank transfer example, if the first update fails, the database rolls back to its original state.	True
91	Git commits are somewhat analogous to SQL transactions with atomicity and durability features.	True
92	Using a WHERE clause in SQL filters groups, not individual rows.	False
93	A SQL UPDATE without a WHERE clause modifies all rows in a table.	True
94	File systems inherently guarantee transactional atomicity like databases do.	False
95	In databases, temporary tables (views) are built dynamically at runtime.	True
96	Using SQL GROUP_CONCAT aggregates numeric columns by adding them together.	False
97	Non-normalized databases tend to be easier to query but harder to update consistently.	True
98	In database design, you can create foreign keys without defining any primary keys.	False
99	SQL databases always physically store tables exactly the way they appear logically.	False
100	ACID principles are critical for ensuring the reliability of database operations.	True