

KK08 — Analytical tools for depicting the relationships between users, data and systems

Analysis & Design · Comprehensive exam study guide

STUDY DESIGN — YOU MUST KNOW

- context diagrams (Level 0) — system components, entities and data flows
- data flow diagrams (Level 1) — processes, entities, data stores and data flows
- use case diagrams — system boundary, actors, associations, relationships (includes/extends) and use cases

These diagrams model the relationships between **users, data and systems**. You must read and interpret them and know each one's components — a very common exam area.

Context diagram (Level 0)

Shows the whole system as a **single process** in the centre, the external **entities** (people/systems) it exchanges data with, and the **data flows** between them. It defines the system boundary at the highest level.

KEY IDEA

Components: one central process (the system), external entities, and labelled data flows. No data stores, no internal processes.

Data flow diagram (Level 1)

Explodes the single process into the **internal processes**, the **data stores** (where data is held), the external **entities**, and the **data flows** between them. It shows how data moves through the system.

KEY IDEA

Adds (vs context diagram): multiple numbered processes and data stores.

Use case diagram

Shows the **system boundary**, the **actors** (users/external systems), the **use cases** (functions the system offers) and the **associations** between them, plus relationships like «include» (a use case always uses another) and «extend» (optional/conditional behaviour).

Element	Meaning
Actor	A user or external system that interacts with the solution.
Use case	A function/task the system provides.
Association	A line connecting an actor to a use case they use.
Include	A use case that always uses another (e.g. 'Place order' includes 'Log in').
Extend	Optional/conditional behaviour added to a use case.

Key definitions to memorise

Context diagram

A top-level (Level 0) model showing the whole system as one process, its external entities and data flows.

Data flow diagram	A Level 1 model showing internal processes, data stores, entities and the data flows between them.
Use case diagram	A model showing the system boundary, actors, use cases and their associations/relationships.
Actor	A user or external system that interacts with the solution in a use case diagram.

Exam technique

EXAM TIP

- Remember the key difference: context diagram = one process, no data stores; DFD = multiple processes + data stores.
- For use cases, learn «include» (always) vs «extend» (optional).

COMMON MISTAKES

- Putting data stores in a context diagram (they belong in the Level 1 DFD).
- Confusing an actor (user/external system) with a use case (a function).

Quick revision checklist

- I can list the components of each diagram type.
- I can interpret a context diagram, DFD and use case diagram.
- I can distinguish include from extend.

Exam practice — questions & model answers

Q1. State two differences between a context diagram and a Level 1 data flow diagram.

State · 2 marks

Model answer

- A context diagram shows the system as a single process; a DFD shows multiple internal processes (1).
- A DFD includes data stores, which a context diagram does not (1).

Q2. In a use case diagram, distinguish between an actor and a use case.

Distinguish · 2 marks

Model answer

- An actor is a user or external system that interacts with the solution (1);
- a use case is a function/task the system provides (1).

Q3. Explain the difference between an «include» and an «extend» relationship.

Explain · 2 marks

Model answer

- Include means a use case always uses another use case (1);
- extend means optional/conditional behaviour that is only sometimes performed (1).