LANGGRAPH COMPLETE NOTES (COMBINED DIAGRAMMATIC EXPLANATION)

SECTION 1: WHAT IS LANGGRAPH?

LangGraph is a framework to build multi-step AI workflows using graphs.

Diagram:

[Nodes] → steps of workflow

[Edges] → connections deciding flow

It provides:

• Multi-step workflows

• State management

• Conditional routing

• Parallelization

• Evaluator–Optimizer loops

• Orchestrator–Worker patterns

• Memory + checkpoints

SECTION 2: LLM WORKFLOWS

LLM workflows break complex tasks into organized steps.

Diagram:

User Input → Process 1 → Process 2 → Process 3 → Output

Benefits:

• Better structure

• Correction loops

• Control over output

• Reliable pipelines

SECTION 3: PROMPT CHAINING (09:07)

Breaking big tasks into smaller prompts.

Diagram:

Prompt 1 → Prompt 2 → Prompt 3 → Final Output

SECTION 4: ROUTING (11:17)

Routing selects the correct agent based on input.

Diagram:

■■■ Agent A

User Query → Router ■■■■ Agent B

■■■ Agent C

SECTION 5: PARALLELIZATION (13:14)

Multiple tasks run at the same time.

Diagram:

■■■ Task A

Input ■■■ Split

■■■ Task B

Then Merge → Final

SECTION 6: ORCHESTRATOR & WORKERS (16:11)

Orchestrator = manager

Workers = specialized agents

Diagram:

■■■ Worker 1

User Query → Orchestrator ■■■■ Worker 2

■■■ Worker 3

↓

Combine Output

SECTION 7: EVALUATOR & OPTIMIZER (19:48)

Evaluator checks quality.

Optimizer improves output.

Diagram:

Draft → Evaluator → Needs Fix? → Optimizer → back to Evaluator

If OK → Final Answer

SECTION 8: GRAPHS, NODES & EDGES

Graphs = Nodes + Edges

Node = a step

Edge = path connecting steps

Diagrams:

Node:

[Node]

Edge:

A → B

Graph:

A → B → C

Conditional:

Yes → Good

Evaluate

No → Improve

Parallel:

■ B

A ■■■

■ C → Merge

SECTION 9: STATE (30:53)

State = data carried through the workflow.

Diagram:

State → Node 1 → Updated State → Node 2 → Updated State → ...

Contains:

• user input

• drafts

• errors

• tool results

• final answer

SECTION 10: REDUCERS (36:07)

Reducers decide how to merge state updates.

Diagram:

Node A output ■■

■■■ Reducer → Combined State

Node B output ■■

Types:

• Replace

• Append

• Merge

SECTION 11: LANGGRAPH EXECUTION MODEL

Complete workflow execution.

Full Diagram:

INITIAL STATE

■

▼

[Node 1]

■

▼

State Update

■

■■■ Node 2

■■■ Conditional Path

■■■ Parallel Tasks (A, B)

■ A ■ B

■ ▼ ▼

■ Reducer Merge

▼

[Evaluation]

■ bad?

▼

[Optimizer] → loop back to Evaluation

■

▼

FINAL NODE → Final State → Output

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