LESSON MAKER PRO

Beat the Deadline

Find the fastest way to finish a project.

HIGH SCHOOL · FM.N.A.20

FM.N.A.20 "Determine the minimum time to complete a project using algorithms to schedule tasks in order, including critical path analysis, the list-processing algorithm, and student-created algorithms."

NAME _____ DATE _____

FIND THE FINISH TIME

Start tasks with no prerequisites at time 0. Each other task starts when its last prerequisite finishes. The latest finish time is the minimum project time, and a critical path is a chain of tasks that takes that long.

WORKED EXAMPLE

Find the minimum time and a critical path. Times are in minutes.

PROJECT TASKS

Task	Time	Needs
A	2	None
B	3	A
C	5	A
D	7	B, C

1. A finishes at 2.
2. B finishes at 5; C finishes at 7.
3. D starts at 7 and finishes at 14.

Answer: 14 minutes; critical path A-C-D.

PRACTICE 4 problems

1 Tasks in minutes: A 4; B 6 after A; C 8 after A; D 1 after B and C. Find the minimum time and a critical path.

ANSWER _____

2 Tasks in minutes: A 6 and B 4 can start now; C 9 follows both. Find the minimum time and a critical path.

ANSWER _____

3 Tasks in minutes: A 8; B 9 after A; C 4 after A. Find the minimum time and a critical path.

ANSWER _____

4 Tasks in minutes: A 9 and B 8 can start now; C 6 follows B; D 10 follows A and C. Find the minimum time and a critical path.

ANSWER _____

APPLY IT Show your work

1 Your club is posting a concert recap. Tasks can overlap when their prerequisites are done. What is the earliest it can go live? Name a critical path.

CONCERT RECAP

Task	Minutes	Needs
A: Script	4	None
B: Film	9	A
C: Titles	6	A
D: Edit	8	B, C

ANSWER _____

2 For a school esports stream, a sound check takes 6 minutes. After it, camera setup takes 8 minutes and overlay setup takes 9 minutes. A 10-minute test stream follows both. What is the earliest launch time? Name a critical path.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Tasks in minutes: A 4; B 8 and C 8 after A; D 6 after B; E 6 after C; F 9 after D and E. Find the minimum time and every critical path.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Tasks in minutes: A 4; B 6 after A; C 8 after A; D 1 after B and C. Find the minimum time and a critical path.	**13 minutes; A-C-D.**
2	Tasks in minutes: A 6 and B 4 can start now; C 9 follows both. Find the minimum time and a critical path.	**15 minutes; A-C.**
3	Tasks in minutes: A 8; B 9 after A; C 4 after A. Find the minimum time and a critical path.	**17 minutes; A-B.**
4	Tasks in minutes: A 9 and B 8 can start now; C 6 follows B; D 10 follows A and C. Find the minimum time and a critical path.	**24 minutes; B-C-D.**

PART 2 · APPLY IT

1. **21 minutes; A-B-D.** Filming ends at minute 13, later than titles at minute 10. Editing then ends at minute 21.
2. **25 minutes; sound check, overlay setup, test stream.** The setups run at the same time. The overlay finishes later, so the total is 6 + 9 + 10 = 25 minutes.

CHALLENGE

27 minutes; A-B-D-F and A-C-E-F.

Accept paths written as task names or letters. In the challenge, both paths are required.