

Plan the Finish

Use critical paths and timelines to build efficient schedules.

HIGH SCHOOL • MA.912.LT.2.3

MA.912.LT.2.3 "Solve scheduling problems using critical path analysis and Gantt charts. Create a schedule using critical path analysis."

NAME _____

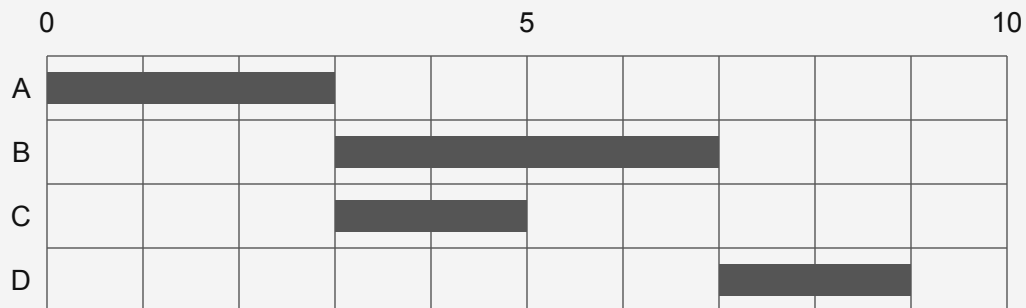
DATE _____

FIND THE CRITICAL PATH

A critical path is the chain of dependent tasks with the greatest total time. On a Gantt timeline, place each task as early as its prerequisites allow, then use the longest chain to find the project finish. All projects start at day 0. Task bars run from the start boundary to the finish boundary; a task may start as soon as every prerequisite finishes.

WORKED EXAMPLE

Read the Gantt chart. A lasts 3 days; B and C follow A; D follows B. What is the project finish day and the critical path?



Elapsed days (start at day 0)

1. Trace A, B, D: $3 + 4 + 2 = 9$.
2. Trace A, C: $3 + 2 = 5$.
3. The longer chain ends on day 9.

Answer: Project finish: day 9. Critical path: A-B-D.

PRACTICE 4 problems

- 1** A takes 5 days. B takes 6 days after A. C takes 8 days after A. D takes 10 days after both B and C. Find the project duration and critical path.

ANSWER _____

- 2** E takes 5 days. F takes 8 days after E. G takes 6 days after E. H takes 10 days after both F and G. Find H's earliest start day and the critical path.

ANSWER _____

- 3** J takes 10 days and K takes 5 days. L takes 6 days after J, and M takes 8 days after K. N takes 5 days after both L and M. What is the critical path?

ANSWER _____

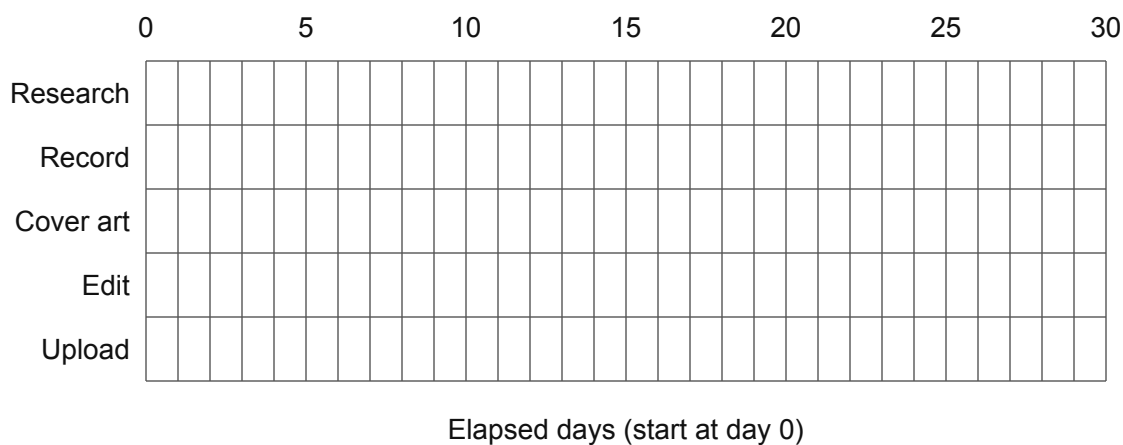
- 4** Schedule these tasks as early as possible. R takes 5 days. S takes 6 days after R. T takes 8 days after R. U takes 10 days after both S and T. List each start-finish interval.

ANSWER _____

1

PODCAST TASK CHART

Task	Days	Must follow
Research	6	None
Record	8	Research
Cover art	5	Research
Edit	10	Record
Upload	5	Edit, Cover art



ANSWER _____

2

For a gaming tournament, venue setup takes 5 days, bracket design takes 10 days, equipment check takes 6 days after setup, volunteer training takes 8 days after bracket design, and the final test takes 5 days after equipment check and training. Find the project duration and critical path.

WORK SPACE

ANSWER

CHALLENGE

One step up

The proposed Gantt chart shows four tasks. S must wait until both Q and R are complete. Is the schedule valid? If not, give S's corrected interval, the project finish day, and the critical path.

0

5

10

15

18

P

Q

R

S

Task	Start Day	End Day
P	0	5
Q	5	11
R	5	13
S	11	16

Elapsed days (start at day 0)

WORK SPACE AND ANSWER

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PRACTICE 1

A takes 5 days. B takes 6 days after A. C takes 8 days after A. D takes 10 days after both B and C. Find the project duration and critical path.

23 days; A-C-D

PRACTICE 2

E takes 5 days. F takes 8 days after E. G takes 6 days after E. H takes 10 days after both F and G. Find H's earliest start day and the critical path.

H starts on day 13; E-F-H

PRACTICE 3

J takes 10 days and K takes 5 days. L takes 6 days after J, and M takes 8 days after K. N takes 5 days after both L and M. What is the critical path?

J-L-N

PRACTICE 4

Schedule these tasks as early as possible. R takes 5 days. S takes 6 days after R. T takes 8 days after R. U takes 10 days after both S and T. List each start-finish interval.

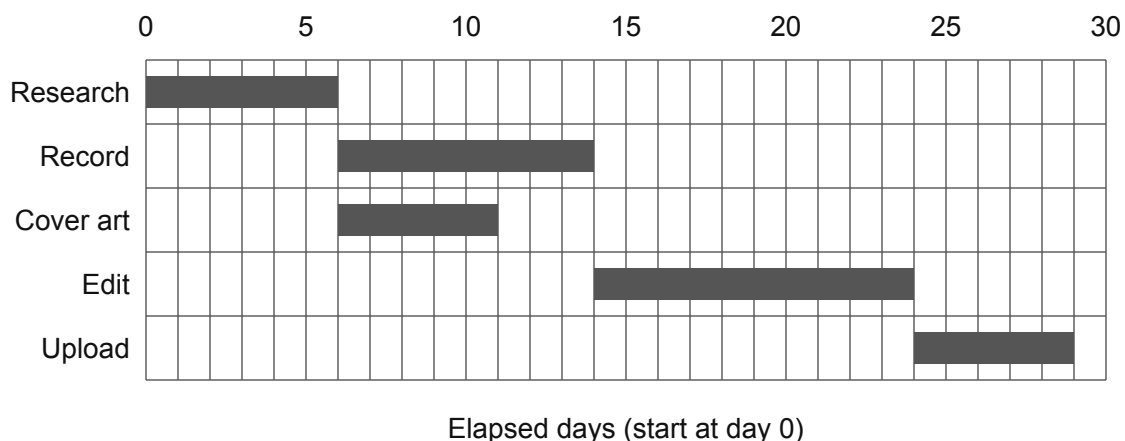
R: 0-5, S: 5-11, T: 5-13, U: 13-23

APPLY IT 2

23 days; Bracket design-Volunteer training-Final test Equipment check finishes on day 11. Volunteer training finishes on day 18. The final test waits for both, starts on day 18, and ends on day 23.

APPLY IT 1

Research: 0-6, Record: 6-14, Cover art: 6-11, Edit: 14-24, Upload: 24-29. Critical path: Research-Record-Edit-Upload. Schedule each task at its earliest allowed start. Upload waits for Edit, so the Research-Record-Edit-Upload chain sets the 29-day finish.

**CHALLENGE**

No. S must run from day 13 to day 18. The project finishes on day 18, and the critical path is P-R-S.

Accept task chains written with arrows instead of hyphens. Accept equivalent interval notation, such as 0 to 5, when all start and finish days are correct. Read each task's bar against the day scale, using day 0. Podcast bars must match all five intervals and dependencies, not merely list the finish day.

