LESSON MAKER PRO

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?

Worked schedule



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 _____

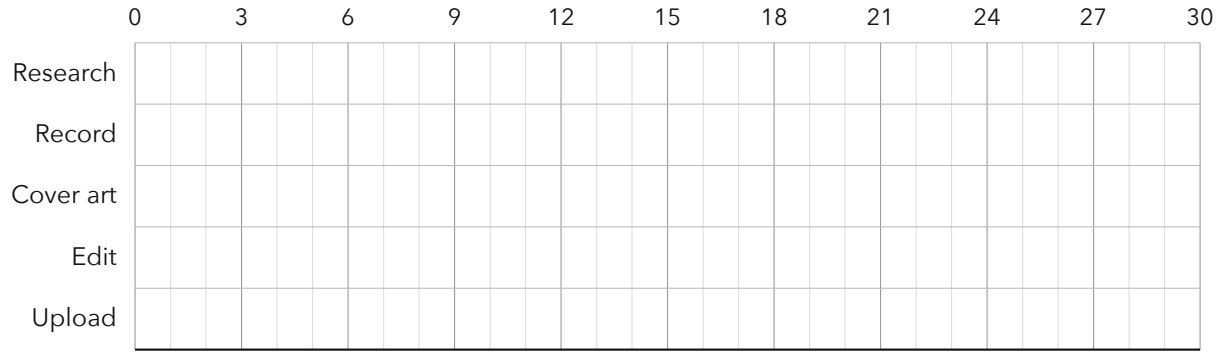
4 Schedule these tasks as early as possible. R takes 5 days. S takes 6 days after R. T takes 8 days after R. U takes 10 days after both S and T. List each start-finish interval.

ANSWER _____

APPLY IT Show your work

1 A student podcast team has these tasks: Research 6 days (no prerequisite); Record 8 days after Research; Cover art 5 days after Research; Edit 10 days after Record; Upload 5 days after both Edit and Cover art. Make an earliest-start Gantt schedule. Draw one bar per task on the blank chart, give each start-finish interval and name the critical path.

Podcast learner schedule



ANSWER _____

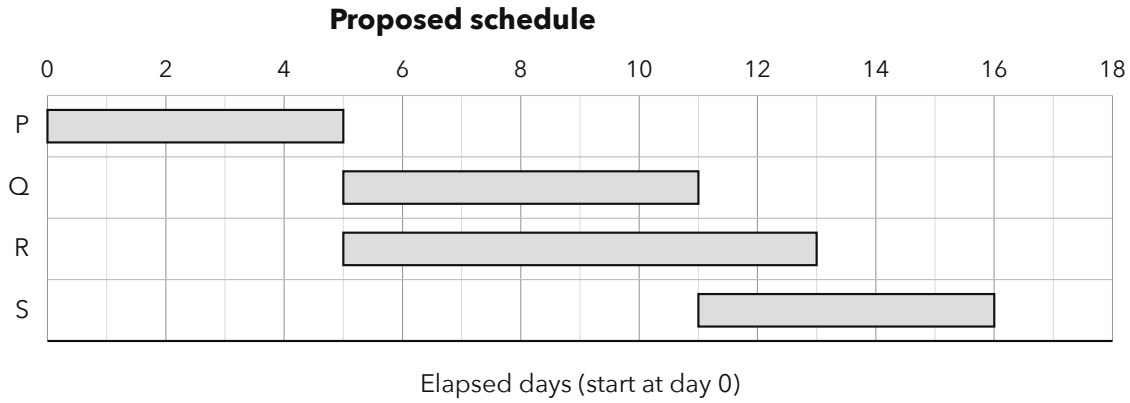
2 For a gaming tournament, venue setup takes 5 days, bracket design takes 10 days, equipment check takes 6 days after setup, volunteer training takes 8 days after bracket design, and the final test takes 5 days after equipment check and training. Find the project duration and critical path.

WORK SPACE

ANSWER _____

CHALLENGE One step up

The proposed Gantt chart shows four tasks. Q and R must both follow P. 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.



WORK SPACE AND ANSWER

Plan the Finish

PART 1 · PRACTICE

#	PROBLEM	ANSWER
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**
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**
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**
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**

PART 2 · APPLY IT

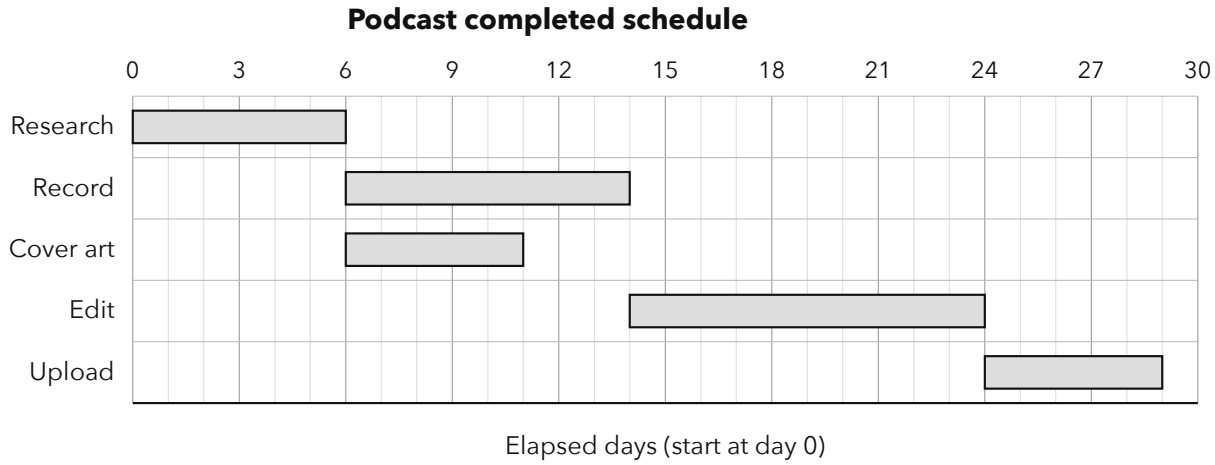
1. **Research: 0-6, Record: 6-14, Cover art: 6-11, Edit: 14-24, Upload: 24-29. Critical path: Research-Record-Edit-Upload.** Schedule each task at its earliest allowed start. Upload waits for Edit, so the Research-Record-Edit-Upload chain sets the 29-day finish.
2. **23 days; Bracket design-Volunteer training-Final test** The setup branch reaches the final test after 11 days. The bracket branch reaches it after 18 days, then the 5-day final test ends on day 23.

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 bars against the day scale. Inspect all five learner podcast bars and prerequisite relationships; intervals and completed bars must agree. Q and R both follow P in the challenge, so P-R-S is the longest dependent chain.

Apply 1: completed earliest-start podcast Gantt schedule



Challenge: corrected Gantt schedule (S waits for Q and R)

