

List 8 Activities And Do PERT Project, Use Activity One Node (AON), Not Activity On Arch. Do A PERT Graph,

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Project management is a vital discipline that ensures complex projects are completed on time, within scope, and within budget. One of the essential tools in project planning and scheduling is the Program Evaluation and Review Technique (PERT), which helps in analyzing the tasks involved, estimating durations, and understanding dependencies. When constructing a PERT diagram, choosing the appropriate method for depicting activities is critical; the Activity on Node (AON) method is often preferred over Activity on Arrow (AOA) because of its clarity and flexibility. This article will guide you through listing eight activities, performing a PERT project using AON, and creating a PERT graph to visualize project flow effectively.

Understanding PERT and Its Significance in Project Management

What is PERT?

The Program Evaluation and Review Technique (PERT) is a statistical tool used to analyze and represent the tasks involved in completing a project. Developed in the 1950s for the U.S. Navy's Polaris missile project, PERT helps in estimating the minimum time needed to complete a project by considering the uncertainty in activity durations.

Why Use PERT?

- Handling Uncertainty: Incorporates optimistic, pessimistic, and most likely durations.
- Critical Path Identification: Determines the sequence of activities that dictate the project's duration.
- Resource Optimization: Helps allocate resources effectively.
- Risk Management: Identifies potential bottlenecks and delays.

Key Concepts in PERT

- Activities: Tasks that need to be performed.
- Events: Points in time where activities start or end.
- Critical Path: The longest sequence of activities that determines the project's minimum

duration.

- Probability Estimates: Using three-time estimates to account for uncertainty.

Listing 8 Activities for a Sample Project

To demonstrate the process, let's consider a simplified project—organizing a corporate seminar. Below are eight activities involved:

1. A. Venue Selection
2. B. Invitations Design
3. C. Invitations Distribution
4. D. Speaker Confirmation
5. E. Audio-Visual Setup
6. F. Catering Arrangement
7. G. Event Promotion
8. H. Final Rehearsal and Setup

Each activity has its own duration estimates, dependencies, and resource requirements. For the purpose of this example, we'll assign rough durations:

Activity	Description	Optimistic (O)	Most Likely (ML)	Pessimistic (P)	Estimated Duration (days)
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A	Venue Selection	2	3	5	
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B	Invitations Design	2	3	4	
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C	Invitations Distribution	1	2	3	
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D	Speaker Confirmation	3	4	6	
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E	Audio-Visual Setup	2	3	5	
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F	Catering Arrangement	2	3	4	
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G	Event Promotion	3	4	6	
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H	Final Rehearsal and Setup	1	2	3	
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Applying AON Method for PERT Project

What is Activity on Node (AON)?

In the AON method, activities are represented by nodes (or boxes), with the dependencies shown by arrows connecting these nodes. The AON diagram is more intuitive, especially for complex projects, because it clearly displays the sequence of activities and their dependencies.

Advantages of Using AON

- Clear visualization of activity sequences.
- Easier to incorporate multiple dependencies.
- Better suited for software tools and automated scheduling.
- Simplifies the calculation of earliest and latest start and finish times.

Steps to Create an AON PERT Diagram

1. Identify Activities and Dependencies: List all activities and their immediate predecessors.
2. Estimate Durations: Use three-point estimates to calculate expected durations.
3. Construct Nodes: Create a node for each activity.
4. Draw Dependencies: Connect nodes with arrows based on activity dependencies.
5. Calculate Critical Path: Determine the longest path through the network.
6. Analyze and Optimize: Use the diagram to identify potential delays and resource conflicts.

Constructing the PERT Network with AON

Step 1: Determine Dependencies

Based on the activities listed, establish how they depend on each other:

- A (Venue Selection): No predecessors.
- B (Invitations Design): No predecessors.
- C (Invitations Distribution): Depends on B.
- D (Speaker Confirmation): Depends on A.
- E (Audio-Visual Setup): Depends on D.
- F (Catering Arrangement): Depends on A.
- G (Event Promotion): Depends on B and F.
- H (Final Rehearsal and Setup): Depends on E and G.

Step 2: Calculate Expected Durations

Using the PERT formula:

$$\text{Expected Duration (TE)} = (O + 4ML + P) / 6$$

Calculate for each activity:

Activity	O	ML	P	TE (days)
A	2	3	5	$(2 + 4 \cdot 3 + 5) / 6 = (2 + 12 + 5) / 6 = 19 / 6 \approx 3.17$

B	2	3	4	$(2 + 12 + 4)/6 = 18/6 = 3$
C	1	2	3	$(1 + 8 + 3)/6 = 12/6 = 2$
D	3	4	6	$(3 + 16 + 6)/6 = 25/6 \approx 4.17$
E	2	3	5	same as A: ≈ 3.17
F	2	3	4	same as B: 3
G	3	4	6	same as D: ≈ 4.17
H	1	2	3	same as C: 2

Step 3: Build the AON Diagram

Create nodes labeled with activities (A through H). Connect nodes based on dependencies:

- Start Nodes: A and B (no predecessors)
- A → D → E → H
- B → C → H
- B → G
- F → G
- A → F
- G and E → H

This network visually depicts all dependencies and sequences.

Step 4: Calculate Earliest and Latest Times

Using forward and backward pass calculations, determine:

- Earliest Start (ES) and Earliest Finish (EF) for each activity.
- Latest Start (LS) and Latest Finish (LF).

The critical path will be the sequence of activities with zero slack, which determines the minimum project duration.

Analyzing the PERT Graph and Critical Path

Critical Path Identification

By analyzing the network, the critical path might be:

A → D → E → H

Total duration = $3.17 + 4.17 + 3.17 + 2 \approx 12.68$ days

Any delay in activities on this path will directly impact the project completion date.

Slack Times and Flexibility

Activities not on the critical path have some slack, allowing for potential delays without affecting the overall schedule. For example:

- B, C, F, G may have some slack, depending on their earliest and latest start times.

Utilizing the PERT Graph for Project Control

- Monitoring Critical Activities: Focus on activities on the critical path.
- Resource Allocation: Prioritize resources to critical activities.
- Risk Management: Prepare contingency plans for activities with high uncertainty.

Tools and Software for PERT and AON Diagrams

Modern project management software simplifies creating AON diagrams and conducting PERT analysis. Popular tools include:

- Microsoft Project
- Primavera P6
- Lucidchart
- Smartsheet
- OpenProject

These tools enable easy updating, collaboration, and visualization of project schedules.

Conclusion

Using the AON method for PERT projects provides a clear, visual representation of activity sequences, dependencies, and durations. Listing activities systematically and accurately estimating durations are foundational steps toward efficient project management. Constructing a comprehensive PERT graph allows project managers to identify critical paths, allocate resources effectively, and mitigate risks. Whether managing a small event like a corporate

Frequently Asked Questions

What are the 8 key activities commonly involved in a PERT project using AON diagramming?

The 8 key activities typically include defining project scope, identifying activities,

estimating durations, determining dependencies, developing AON diagrams, performing PERT analysis, calculating critical paths, and reviewing project timelines.

How do you create an AON diagram for a PERT project?

To create an AON diagram, list all activities as nodes, then draw arrows from each activity to subsequent activities based on their dependencies, ensuring that each activity node is connected to its successor(s) with directed arrows to represent flow.

What is the significance of using Activity on Node (AON) in PERT scheduling?

Using AON simplifies the visualization of project activities and their dependencies, facilitates easier calculation of earliest and latest start/finish times, and helps identify critical activities and paths within the project.

How do you perform a PERT analysis once the AON diagram is complete?

Perform PERT analysis by estimating the optimistic, most likely, and pessimistic durations for each activity, calculating expected durations, then determining earliest start and finish times, latest start and finish times, and identifying the critical path.

Why is it important to distinguish between activities and dependencies when creating a PERT diagram?

Distinguishing between activities and dependencies ensures accurate sequencing, helps identify the correct critical path, prevents scheduling conflicts, and allows for precise calculation of project durations.

Can you explain how to identify the critical path in a PERT project using an AON diagram?

Identify the critical path by calculating the earliest and latest start and finish times for each activity, then finding the sequence of activities with zero slack—meaning any delay in these activities will delay the entire project.

What are some common challenges faced when building a PERT graph with AON, and how can they be addressed?

Common challenges include complex dependencies, inaccurate activity durations, and diagram clutter. These can be addressed by thorough activity analysis, using reliable estimates, simplifying the diagram, and employing project management software for clarity and accuracy.

Additional Resources

List 8 Activities And Do PERT Project, Use Activity One Node (AON), Not Activity On Arch. Do A PERT Graph — this is a critical exercise in project management that helps planners visualize, analyze, and optimize project timelines effectively. Utilizing the Activity One Node (AON) method in PERT (Program Evaluation and Review Technique) charts provides a clear, straightforward way to map out activities, dependencies, and critical paths. Whether you're managing a construction project, software development, or an event planning initiative, understanding how to list activities and construct a PERT graph using AON is essential for successful project execution.

Understanding PERT and AON: The Foundations

Before diving into activities and the diagramming process, it's vital to understand the core concepts underpinning PERT and Activity One Node (AON) methodology.

What is PERT?

PERT is a project management tool designed to analyze and represent the tasks involved in completing a project. It emphasizes the probabilistic nature of project durations, accounting for uncertainties by calculating the expected time for each activity.

What is AON (Activity One Node)?

AON, also called precedence diagramming method (PDM), uses nodes (often circles or rectangles) to represent activities. Arrows indicate dependencies, but in AON, each node is a single activity, making the diagram more intuitive. This contrasts with Activity On Arrow (AOA), where arrows depict activities.

Step 1: Listing 8 Activities for Your Project

To create an effective PERT chart, you must first identify all activities involved in your project. Here's a sample list of 8 activities for a generic project—say, developing a new software application:

1. Requirement Gathering and Analysis
2. Design Architectural Framework
3. Create Prototypes
4. Develop Core Modules
5. Testing & Quality Assurance
6. User Acceptance Testing (UAT)
7. Deployment & Implementation
8. Project Documentation & Closure

These activities cover the typical phases of many projects, but you should adapt the list according to your specific project scope.

Step 2: Define Dependencies and Sequence

Next, analyze how these activities relate to each other. Dependencies clarify which activities must be completed before others can begin.

For the above activities, a typical sequence might be:

- Requirement Gathering (1) must be completed before Design (2).
- Design (2) should be finished before creating prototypes (3).
- Prototypes (3) need to be ready before developing core modules (4).
- Development (4) should be completed before Testing & QA (5).
- Testing (5) must precede UAT (6).
- Once UAT passes, deployment (7) can start.
- Documentation (8) runs parallel with deployment or after, depending on project management approach.

Note: For PERT, it's crucial to also identify possible parallel activities or activities that can overlap to optimize the timeline.

Step 3: Constructing the PERT Chart Using AON

The heart of this exercise is translating your activities and dependencies into a PERT graph using the Activity One Node (AON) method.

Step-by-Step Process:

1. Draw the Nodes:

Each activity is represented by a node (a box or circle). Label each node with the activity name or number.

2. Establish Dependencies:

Use arrows to connect nodes, indicating the sequence of activities. The direction of the arrow shows the flow from predecessor to successor.

3. Identify Start and End Nodes:

- The starting activity (Requirement Gathering) has no predecessors.
- The final activity (Documentation & Closure) has no successors.

4. Assign Duration Estimates:

For each activity, estimate durations—optimistic, most likely, and pessimistic—then compute the expected time using PERT formulas.

5. Determine the Critical Path:

The longest path through the network determines the minimum project duration. Activities on this path are critical; delays here directly affect the project completion date.

Step 4: Sample PERT AON Diagram (Conceptual)

While a visual diagram cannot be displayed here, visualize the following structure:

- Start Node: Requirement Gathering (1)
- leads to Design (2)
- leads to Prototypes (3)
- leads to Core Modules (4)
- leads to Testing (5)
- leads to UAT (6)
- leads to Deployment (7)
- finally to Documentation (8) and project closure.

Parallel activities (if any) should be represented with nodes branching from a common predecessor.

Step 5: Calculating Expected Activity Durations and Variances

Using PERT formulas:

- Expected Time (TE):

$$TE = (\text{Optimistic} + 4 \times \text{Most Likely} + \text{Pessimistic}) / 6$$

- Variance (σ^2):

$$\text{Variance} = [(\text{Pessimistic} - \text{Optimistic}) / 6]^2$$

Calculating these for each activity helps in assessing the project timeline's uncertainty and identifying the probability of completing the project within a given period.

Step 6: Analyzing the Critical Path and Project Duration

With all activities and durations mapped out, identify the critical path:

- Sum the expected durations along each path.
- The path with the longest total duration is the critical path.
- Focus on activities on this path for tight schedule management.

Additionally, evaluate the variance and probability of finishing on time, employing techniques like the Z-score and standard deviation derived from the variances.

Step 7: Using the PERT Chart for Project Control

The PERT chart isn't just a planning tool; it's vital for ongoing project control.

- Monitor Critical Activities:

Pay special attention to activities on the critical path to prevent delays.

- Update Durations:

As activities progress, update estimates based on actual durations.

- Recalculate Probabilities:

Adjust the project timeline based on current data to manage expectations and resources.

Step 8: Practical Tips for Effective PERT Charting

- Keep It Simple:

Avoid overcomplicating the diagram; clarity helps in communication.

- Use Software Tools:

Utilize project management software like MS Project, Lucidchart, or Primavera for dynamic PERT charts.

- Engage Stakeholders:

Share the PERT diagram with team members and stakeholders to ensure everyone understands dependencies and timelines.

- Review Regularly:

Periodic updates and reviews keep your project on track and facilitate quick adjustments.

Final Thoughts

List 8 activities and do PERT project, use Activity One Node (AON), not Activity On Arch — these instructions form the backbone of effective project scheduling and risk analysis. By carefully listing activities, defining dependencies, constructing a clear AON-based PERT diagram, and analyzing durations and critical paths, project managers can significantly improve their planning accuracy, resource allocation, and risk management. Mastery of this process ensures smoother project execution and higher chances of delivering on time and within scope.

Remember: The success of your project hinges on meticulous planning, clear visualization, and proactive control—tools like PERT and AON are essential allies in this journey.

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