1. One of the Risks of our project plan for SSC: the government grants process might involve approval delays, impacting scheduled projects.

**Explanation with EVM:**

**Planned Value (PV):** Estimate the planned budget for the project up to the point of government grant approval.

**Earned Value (EV):** The value of work performed, measured against the planned progress.

**Actual Cost (AC):** The actual cost incurred in performing the work.

**Cost Performance Index (CPI):**

A CPI less than 1 would indicate that the project is over budget.

Formula: CPI=AC/EV​

**Schedule Performance Index (SPI):**

An SPI less than 1 would indicate that the project is behind schedule.

Formula: SPI=PV/EV​

**Example**

Suppose the planned budget (PV) for the project up to the point of government grant approval is $50,000, and the earned value (EV) is $40,000 due to the delay. The actual cost (AC) incurred is $45,000.

CPI=45,000/40,000​ = 0.89 (Over budget)

SPI=50,000/40,000​ = 0.8 (Behind schedule)

Using this risk, we can demonstrate how EVM metrics provide insights into cost and schedule performance and assess the impact of government grant approval delays.

**Explanation with EMV**

EMV involves assigning a monetary value to each possible outcome of a risk event, considering the probability of each outcome occurring.

The formula is EMV = Probability \* Impact.

Where:

EMV is the Expected Monetary Value,

The impact is the potential impact or cost associated with the risk,

Probability is the probability of the risk occurring.

**Example**

If the potential impact (I) of the grant approval delay is $50,000 and the probability of occurrence (P) is 0.2, then 0.2 \* $50,000 = $10,000. Therefore, in this scenario, if there's a 20% chance of a one-month delay in grant approval, the Expected Monetary Value (EMV) would be $10,000.

**Key Difference:**

- EVM primarily focuses on assessing project performance by integrating cost, schedule, and scope metrics.

- EMV on the other hand, is a risk management technique that quantifies the monetary impact of potential risks.

In short, while EVM assesses project performance through cost and schedule metrics, EMV quantifies the monetary impact of risks, making them distinct but complementary tools in the project.

2. A closed network diagram, where all activities have clearly defined predecessors and successors, is essential for effective project management.

**Importance:**

1. **Logical Sequence of Activities:**

It is like having a logical flow showing the flow and dependencies of tasks.Creating a closed network diagram is important because it helps ensure that all project activities are connected from start to finish, leaving no loose ends. This logical flow helps in understanding the relationship between different tasks and ensures that activities are completed in the right order to achieve project objectives. Without a closed network diagram, it becomes challenging to establish the correct sequence, leading to confusion, rework, and potential delays.

1. **Accurate Schedule and Resource Planning**

A closed network diagram is crucial for accurate schedule and resource planning. If there are activities without predecessors or successors, it could indicate oversights in task planning and resource allocation. Having a closed diagram assists in identifying and addressing such issues early on. Lacking a closed network diagram makes it challenging to discern the interdependencies among activities, resulting in imprecise scheduling and resource allocation. This can result in overallocation or underutilization of resources, impacting project timelines and efficiency.

3. Here's a breakdown of the differences between effort, duration, and elapsed time:

**Concept of effort, duration elapsed time:**

**Effort:**

It refers to the actual amount of labour or work hours required to complete a task or activity. It represents the total time a person or a team spends working on a specific task.it is usually measured in person hours or person days.

Example: If a task requires one person to work for 8 hours, the effort for that task is 8 person hours.

**Duration:**

It is the total calendar time required to complete a task, including both the active working time (effort) and any potential idle time or breaks between work sessions. It is measured in hours, days, weeks, or months.

Example: If a task requires 8 hours of effort but is spread over two days due to work being done only in the mornings for 4 hours due to scheduling constraints or interruptions, then the duration counts 2 days.

**Elapsed Time:**

It is the total time that passes from the beginning to the end of a task, including all working and non-working periods, holidays, and weekends. It represents the actual time taken from the start to the completion of a task.

**Example:** If a task starts on Monday and finishes on Wednesday, the elapsed time is 3 days, even if the effort and active working time were less.

To conclude, effort is the actual work hours, duration is the total calendar time, and elapsed time is the overall time from start to finish, including all breaks and non-working periods. Understanding these distinctions is crucial for accurate project planning and scheduling.

4. CPI and SPI

**CPI:** The Cost Performance Index (CPI) is a measure of earned value management that indicates the efficiency of cost performance on a project.

**Interpretation**:

A CPI value greater (>) than 1 indicates that the project is under budget, while a value less (<) than 1 suggests it's over budget.

For example, a CPI of 1.2 means the project is performing 20% under budget.

**SPI:** The Schedule Performance Index (SPI) measures the efficiency of time performance.

**Interpretation**

Like CPI, an SPI value greater (>) than 1 signifies that the project is ahead of schedule, while a value less than 1 indicates it's behind schedule.

For example, an SPI of 0.8 means the project is progressing at 80% of the planned rate.

both CPI and SPI provide an overview of how well a project is meeting its cost and schedule objectives, with values above 1 being favourable.

5 Risk from SCC’s strategic plan: Delays in the government grants approval process

Cause: Delays in the government grants approval process.

Condition: If the government grants approval process experiences unforeseen complications or bureaucratic hurdles.

Conclusion: This risk could result in project timeline setbacks and hinder the seamless execution of scheduled activities, impacting overall project delivery.

**Explanation:**

The cause statement addresses the root of the risk, focusing on the potential for delays in the government grants approval process due to factors like bureaucratic hurdles, administrative inefficiencies, regulatory changes, or unforeseen complications. condition statement establishes the circumstances under which the risk becomes active—contingent upon facing unforeseen complications or bureaucratic hurdles, such as additional documentation requirements or procedural changes during the approval process. Finally, the conclusion statement highlights the potential consequences if the risk materializes, emphasizing that significant delays in project timelines may occur, impacting crucial milestones and causing setbacks in overall project delivery. This, in turn, could lead to adverse outcomes such as budget overruns, compromised project objectives, and stakeholder dissatisfaction.

6. Below 3 documents need to be updated

Project Budget:

Change: Revise the budget by identifying cost-saving measures and reallocating resources to accommodate the 25% reduction in funding. Adjust cost estimates for various components of the event, such as logistics, security, and participant services.

Project Schedule:

Change: Adjust the timeline by resequencing tasks, optimizing resource allocation, and ensuring critical milestones are still met despite the reduced budget. ensuring the event is still delivered on Patriot's Day, the third Monday in April.

Communication Plan:

Change: Update the communication plan to inform stakeholders, sponsors, and participants about the budget cut, emphasizing any necessary adjustments to the event without compromising its essence.

7. Below is the advantage of a matrix organization with leverage

Enhanced Collaboration:

Advantage: Improved collaboration between functional and project teams.

Leverage: Foster stronger communication and cooperation across different departments, ensuring seamless integration of diverse skills into project tasks.

Flexible Resource Allocation:

Advantage: Ability to flexibly allocate resources based on project needs.

Leverage: Optimize resource utilization by tapping into specialized skills from functional teams when required, enhancing project efficiency.

Better Project Control:

Advantage: Clearer lines of authority and responsibility.

Leverage: Strengthen project control by defining roles and responsibilities, minimizing confusion, and ensuring accountability for project outcomes.

Improved Decision-Making:

Advantage: Enhanced decision-making through input from diverse functional experts.

Leverage: Tap into the expertise of functional team members, leading to well-informed decisions and innovative problem-solving within the project.

Skill Development Opportunities:

Advantage: Opportunities for cross-functional skill development.

Leverage: Encourage skill sharing and learning across teams, promoting a dynamic project environment that fosters continuous improvement and adaptability

8. Budget reserve, Management reserve and padding or slush funds

**Budget Reserve:** these are contingencies allocated within specific project cost elements, like construction activities. They serve to account for uncertainties in the scope of work or unexpected events that may impact specific tasks.

**Management Reserve:** Management reserves are set aside at the project level to address unknown unknowns or risks that may emerge during the entire project lifecycle. They provide a buffer for unforeseen circumstances not captured in detailed estimates.

Padding, or slush funds, involves adding extra funds without clear justification.

Lack of transparency: This is not an acceptable estimating practice because it lacks transparency and accountability.

Misallocation of resources: It hinders accurate budgeting and may lead to inefficient resource allocation.

Undermining Accountability: Padding undermines the team's responsibility by making them think there's extra money available, which might reduce their commitment to managing risks carefully.

In contrast, budget and management reserves are based on a thorough understanding of potential risks and uncertainties, providing a structured and accountable approach to managing project contingencies.

9. Types of estimating methods

Analogous Estimating/Top-down approach: it relies on historical data from similar projects to estimate the duration and cost of current activities.

When useful: It is a quick and simple method, useful when detailed project information is limited then a quick and rough estimate helps based on historical similarities.

Parametric Estimating: Parametric estimating uses statistical relationships between historical data and other variables (parameters) to calculate an estimate for the project activities. It involves using a unit rate or parameter, such as cost per square foot or hours per unit, to estimate activity costs or durations. This method is more detailed than analogous estimating and often involves using mathematical models or algorithms to derive estimates based on known variables.

When useful: there's a clear connection between the size of the project and the effort or cost involved, making the estimation process more systematic and quantitative.

Three-Point Estimating: Three-point estimating involves creating optimistic (best-case scenario), pessimistic (worst-case scenario), and most likely for each activity. The three estimates are then averaged using a formula like the Program Evaluation and Review Technique (PERT), providing a more nuanced and risk-adjusted estimate.

When useful: is particularly useful when there are uncertainties and risks in project activities as offering a detailed estimate by considering best-case, worst-case, and most likely scenarios.

Formula: *TE*=(*O*+4*M*+*P*)/6

O is the optimistic (best-case) estimate,

M is the most likely estimate, and

P is the pessimistic (worst-case) estimate.

10. In the Conduct Procurement process, three crucial activities unfold

First, a **Bidder Conference** is conducted, where potential suppliers gather to discuss project requirements and seek clarification. This aids in fostering a shared understanding, promoting fair competition, and eliciting accurate and competitive bids.

The second key activity is **Proposal Evaluation**, involving the thorough assessment of received proposals against predefined criteria. This evaluation, which considers factors like cost, technical capabilities, and past performance, enables an objective comparison of bids. It is a critical step in selecting the most suitable supplier for the project.

The final significant activity is **Contract Negotiation**, where discussions take place with the chosen supplier to finalize terms, conditions, and pricing before a formal contract is established. This negotiation ensures a clear alignment of expectations between both parties, reducing the likelihood of disputes during the execution of the project. Together, these activities form a comprehensive approach to procure goods or services effectively and efficiently.

11. Baselines are prepared on triple constraints – Scope, Time, Cost (and Quality) – management areas.

Scope Baseline: The scope baseline defines the project's scope, including the project scope statement, work breakdown structure (WBS), and the WBS dictionary. It outlines what work is included and excluded, ensuring a clear understanding of project boundaries.

Schedule Baseline: The schedule baseline comprises the project schedule, including a timeline of tasks, milestones, and their dependencies. It reflects the planned start and finish dates for each activity, providing a roadmap for project execution and time management.

Cost Baseline: The cost baseline integrates cost estimates, budgets, and the project's financial plan. It outlines the anticipated costs for labour, materials, and other resources over the project's duration. The cost baseline is crucial for tracking and controlling project expenditures.

These three baselines collectively form the overall project baseline, serving as a comprehensive reference for project management. They ensure alignment between project scope, schedule, and budget, providing a foundation for effective project planning, monitoring, and control.

12.below are mentioned 3 integration

Integration with Scope Management

The communication plan aligns with the scope by outlining how project goals and deliverables will be communicated. Clear communication ensures everyone understands project objectives, reducing the risk of scope misunderstandings.

Integration with Risk Management:

The communication plan incorporates risk communication strategies. In the case of risks, it defines how information will be shared, ensuring a proactive approach to risk management, and minimizing potential project impacts.

Integration with Stakeholder Management:

The communication plan is closely tied to stakeholder management by identifying key stakeholders and determining the frequency and mode of communication with each. This integration ensures that stakeholders are kept informed and engaged throughout the project lifecycle.

In short, the communication plan's integration with Scope, Risk, and Stakeholder Management ensures clear project goals, proactive risk management, and sustained stakeholder engagement. This comprehensive approach enhances transparency and control, crucial for achieving project success.

**13.**

Integration of Lessons Learned Process:

When: The team should integrate the process for conducting lessons learned throughout the project lifecycle, not just at the end. Regular reviews at key milestones or project phases ensure continuous improvement and timely adjustments.

Participants in Lessons Learned Sessions:

All project team members, including stakeholders, should participate in lessons-learned sessions. This inclusive approach gathers diverse perspectives, fostering a comprehensive understanding of project experiences.

Document Type: A Lessons Learned Document or Report is typically used to record knowledge gained during the project. This document captures insights, successes, challenges, and best practices. It serves as a valuable resource for future projects, aiding in continuous improvement and knowledge transfer.

To conclude, integrate lessons learned throughout, involve all team members and stakeholders in regular sessions, and document insights for continuous improvement in the construction of Northeastern University's new science building.

14. Qualitative risk analysis

Risk Probability and Impact Assessment  
For qualitative risk analysis, one effective tool is the Probability and Impact Matrix.

This tool helps assess the likelihood (probability) and consequence (impact) of identified risks, allowing for a systematic evaluation of their significance.

How?

The analysis is conducted by assigning a probability and impact rating to each identified risk. These ratings are often defined on a scale (e.g., low, medium, high). The results are then plotted on a matrix, creating a visual representation that categorizes risks based on their assessed probability and impact.

The benefit of using the Probability and Impact Matrix lies in its ability to prioritize risks. By visually mapping out risks in terms of their potential severity, the project team can focus attention on addressing the most significant threats. This prioritization aids in the development of targeted risk response plans and resource allocation, ultimately enhancing the project's ability to proactively manage and mitigate potential issues.

**Example**

Risk: Government Grant Approval Delays

Probability Assessment:

Considering past experiences and discussions with stakeholders, the team rates the probability of approval delays as "Medium" because delays have occurred occasionally but are not a constant occurrence.

Impact Assessment:

Evaluating the impact on the project schedule and objectives, the team rates the impact as "High" since delays in government grant approval can potentially impact timelines, funding availability, and subsequent project activities.

15.Below I mentioned 5 actions with justification.

Comprehensive Review: it is important to identify the missed deliverable to understand its scope and impact on the project and then document its description, purpose, and requirements. This ensures that the missing work is properly acknowledged and understood. This action is crucial for addressing the oversight and ensuring that the entire project team is aware of the omission.

Assess Impact on Schedule: Evaluate the impact of the missed deliverables and associated activities on the project schedule. This assessment helps in understanding the extent of the delay and facilitates adjustments to the timeline as needed.

Update the WBS and Scope Statement: Revise the Work Breakdown Structure (WBS) and Scope Statement to include the missed deliverables and associated activities. This ensures that the project documentation accurately reflects the project scope, preventing further oversights.

Communicate Changes to Stakeholders: Inform stakeholders about the missed deliverables and schedule adjustments. Effective communication ensures that everyone is on the same page, manages expectations, and minimizes surprises during the project execution.

Reassess Resource Allocation: Evaluate the impact on resource allocation, considering the additional activities. This reassessment helps in identifying if there's a need for reallocation or adjustments to maintain an efficient project workflow.