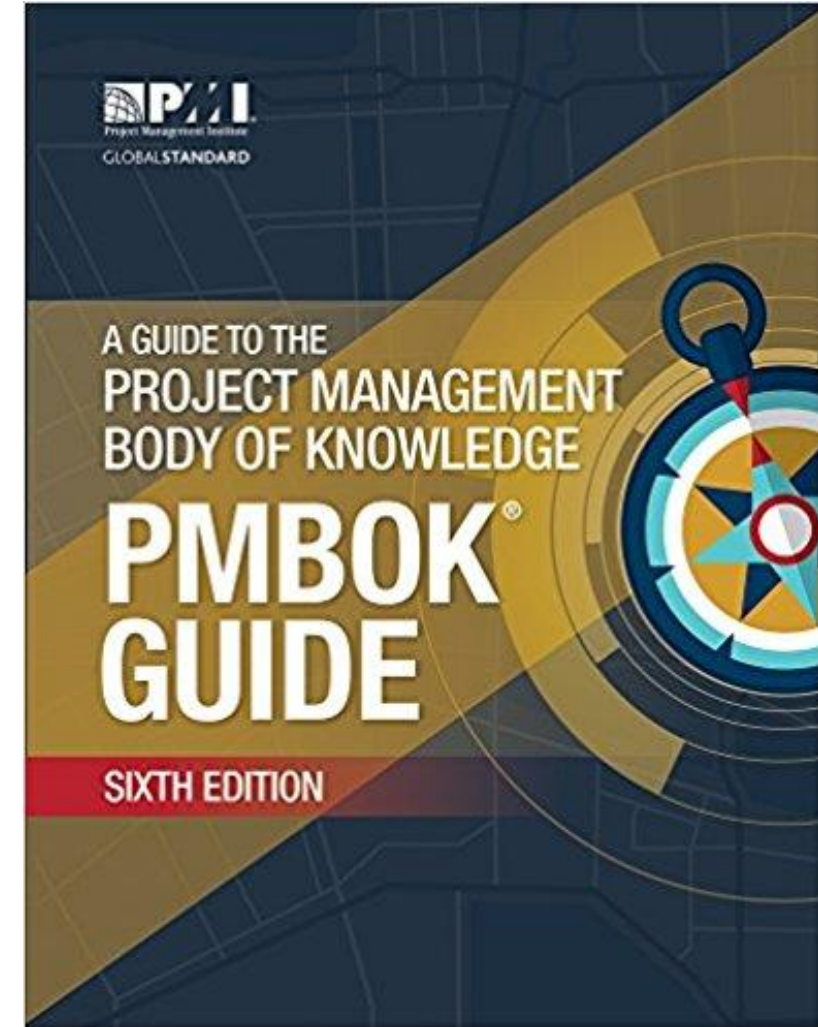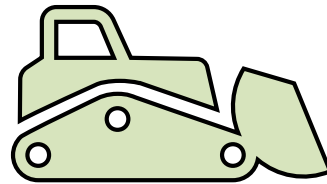**Session Introduction: CAPM® Exam Prep 6th Edition**

Inputs, Tools and Techniques, and Outputs (ITTOs)

PMBOK® Guide 6th Edition

- This is the correct version of the PMBOK Guide.
- Although the PMBOK Seventh edition has been released, the CAPM® exam is still aligned to the PMBOK 6th edition.

PMBOK® is a trademark and the PMI® logo is a registered mark of Project Management Institute, Inc.

Process Groups

Initiating → **Planning** → **Executing** → **Monitoring & Controlling** → **Closing**

Knowledge Areas

Integration

Scope

Schedule

Cost

Quality

Resources

Communication

Risk

Procurement

Stakeholders

I

Stopped

So I

Could

Quickly

Remove a

Coiled

Red

Poisonous

Snake

Starting the Project	Organizing and preparing	Carrying out the work		Closing the Project
Project charter	Project Management Plan	Accepted Deliverables		Project Archived Documents

	Project Management Process Groups				
	Initiating	**Planning**	**Executing**	**Monitoring and Controlling**	**Closing**
Integration	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
Scope		5.1 Plan Scope Management 5.2 Collect requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Schedule		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
Cost		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Quality		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Resource		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Communications		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Risk		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Procurement		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Stakeholder	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Inputs, Tools and Techniques, Outputs

Example: Make some coffee.

Inputs

1. Coffee Beans

Tools & Techniques

1. Grind the beans
2. Brew the coffee

Outputs

1. Coffee

Project Management Institute, A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition, Project Management Institute Inc., 2017
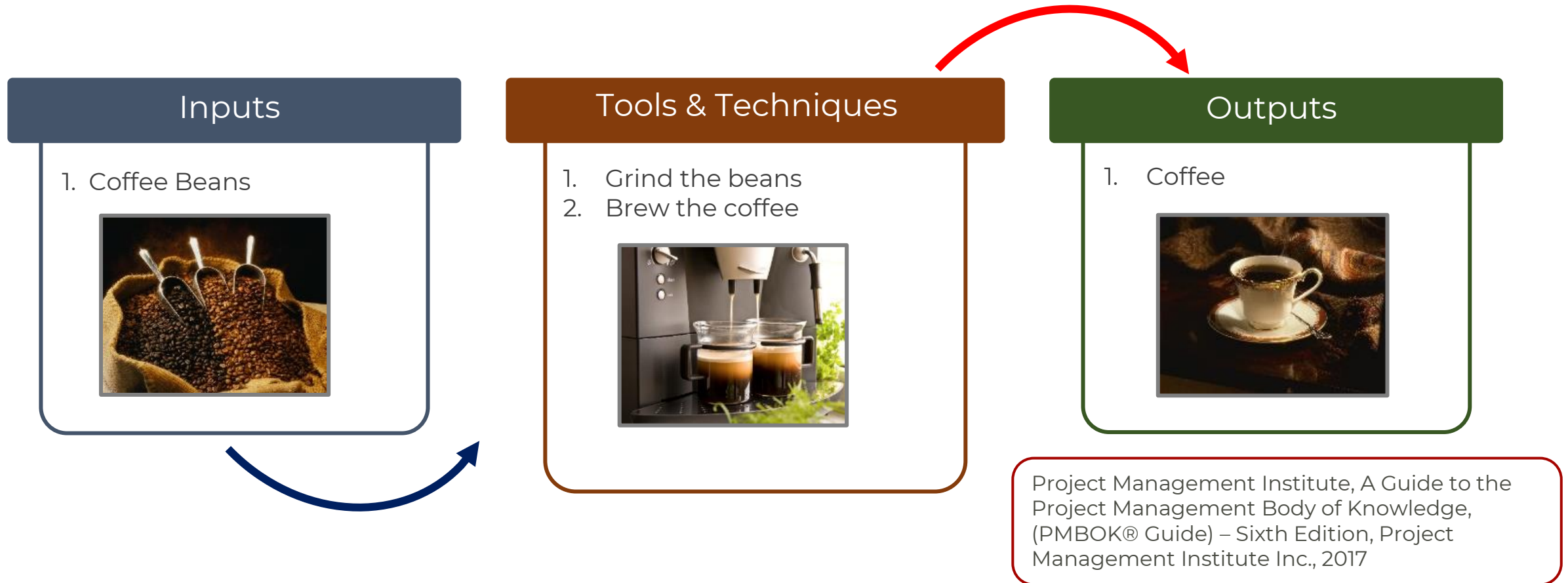
4.1 Develop Project Charter

Inputs

1. *Business documents*
   - Business case
2. **Agreements**
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data gathering**
   - Brainstorming
   - Focus groups
   - Interviews
3. **Interpersonal and team skills**
   - Conflict management
   - Facilitation
   - Meeting Management
4. **Meetings**

Outputs

1. **Project charter**
2. **Assumption log**

13.1 Identify Stakeholders

skillsoft

Inputs

1. **Project charter**
2. **Business documents**
   - Business case
   - Benefits management plan
3. **Project management plan**
   - Communications management plan
   - Stakeholder engagement plan
4. **Project documents**
   - Change log
   - Issue log
   - Requirements documentation
5. **Agreements**
6. **Enterprise environmental factors**
7. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data gathering**
   - Questionnaires and surveys
   - Brainstorming
3. **Data analysis**
   - Stakeholder analysis
   - Document analysis
4. **Data representation**
   - Stakeholder mapping/representation
5. **Meetings**

Outputs

1. **Stakeholder register**
2. **Change requests**
3. **Project management plan updates**
   - Requirements management plan
   - Communications management plan
   - Risk management plan
   - Stakeholder engagement plan
4. **Project documents updates**
   - Assumption log
   - Issue log
   - Risk register

4.2 Develop Project Management Plan

skillsoft

Inputs

1. Project charter
2. *Outputs from other processes*
3. Enterprise environmental factors
4. Organizational process assets

Tools & Techniques

1. Expert judgment
2. Data gathering
   - Brainstorming
   - Checklists
   - Focus groups
   - Interviews
3. Interpersonal and team skills
   - Conflict management
   - Facilitation
   - Meeting management
4. Meetings

Outputs

1. Project management plan

5.1 Plan Scope Management

skillsoft

Inputs

1. **Project charter**
2. **Project management plan**
   - Quality management plan
   - Project life cycle description
   - Development approach
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data analysis**
   - Alternatives analysis
3. **Meetings**

Outputs

1. **Scope management plan**
2. **Requirements management plan**

5.2 Collect Requirements

Inputs

1. **Project charter**
2. **Project management plan**
   - Scope management plan
   - Requirements management plan
   - Stakeholder engagement plan
3. **Project documents**
   - Assumption log
   - Lessons learned register
   - Stakeholder register
4. **Business documents**
   - Lessons learned register
5. **Agreements**
6. **Enterprise environmental factors**
7. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data gathering**
   - Brainstorming
   - Interviews
   - Focus groups
   - Questionnaires and surveys
   - Benchmarking
3. **Data analysis**
   - Document analysis
4. **Decision making**
   - Voting
   - Autocratic decision making
   - Multicriteria decision analysis
5. **Data representation**
   - Affinity diagrams
   - Mind mapping
6. **Interpersonal and team skills**
   - Nominal group technique
   - Observation/conversation
   - Facilitation
7. **Context diagram**
8. **Prototypes**

Outputs

1. **Requirements documentation**
2. **Requirements traceability matrix**

Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition*, Project Management Institute Inc., 2017, Page 138

5.3 Define Scope

Inputs

1. **Project charter**
2. **Project management plan**
   - Scope management plan
3. **Project documents**
   - Assumption log
   - Requirements documentation
   - Risk Register
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data analysis**
   - Alternatives analysis
3. **Decision making**
   - Multicriteria decision making
4. **Interpersonal and team skills**
   - Facilitation
5. **Product analysis**

Outputs

1. **Project scope statement**
2. **Project documents updates**
   - Assumptions log
   - Requirements documentation
   - Requirements traceability matrix
   - Stakeholder register

Planning | Schedule

6.1 Plan Schedule Management

Inputs

1. **Project charter**
2. **Project management plan**
   - Scope management plan
   - Development approach
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data analysis**
   - Alternatives analysis
3. **Meetings**

Outputs

1. **Schedule management plan**

Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition*, Project Management Institute Inc., 2017, Page 179

6.2 Define Activities

Inputs

1. **Project management plan**
   - Schedule management plan
   - Scope baseline
2. **Enterprise environmental factors**
3. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Decomposition**
3. **Rolling wave planning**
4. **Meetings**

Outputs

1. **Activity list**
2. **Activity attributes**
3. **Milestone list**
4. **Change requests**
5. **Project management plan updates**
   - Schedule baseline
   - Cost baseline

6.3 Sequence Activities

Inputs

1. **Project management plan**
   - Schedule management plan
   - Scope baseline
2. **Project documents**
   - Activity attributes
   - Activity list
   - Assumption log
   - Milestone list
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Precedence diagramming method**
2. **Dependency determination and integration**
3. *Leads and lags*
4. **Project management information system**

Outputs

1. **Project schedule network diagrams**
2. **Project documents updates**
   - Activity attributes
   - Activity list
   - Assumption log
   - Milestone list

9.2 Estimate Activity Resources

skillsoft

Inputs

1. **Project management plan**
   - Resource management plan
   - Scope baseline
2. **Project documents**
   - Activity attributes
   - Activity list
   - Assumption log
   - Cost estimates
   - Resource calendars
   - Risk register
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Bottom-up estimating**
3. **Analogous estimating**
4. **Parametric estimating**
5. **Data analysis**
   - Alternatives analysis
6. **Project management information system**
7. **Meetings**

Outputs

1. **Resource requirements**
2. **Basis of estimates**
3. **Resource breakdown structure**
4. **Project documents updates**
   - Activity attributes
   - Assumption log
   - Lessons learned register

6.4 Estimate Activity Durations

skillsoft

Inputs

1. **Project management plan**
   - Schedule management plan
   - Scope baseline
2. **Project documents**
   - Activity attributes
   - Activity list
   - Assumption log
   - Lessons learned register
   - Milestone list
   - Project team assignments
   - Resource breakdown structure
   - Resource calendars
   - Resource requirements
   - Risk Register
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Analogous estimating**
3. **Parametric estimating**
4. **Three-point estimating**
5. **Bottom-up estimating**
6. *Data analysis*
   - Alternatives analysis
   - Reserve analysis
7. **Decision making**
   - Voting
8. **Meetings**

Outputs

1. **Duration estimates**
2. **Basis of estimates**
3. **Project documents updates**
   - Activity attributes
   - Assumption log
   - Lessons learned register

6.5 Develop Schedule

skillsoft

Inputs

1. **Project management plan**
   - Schedule management plan
   - Scope baseline
2. **Project documents**
   - Activity attributes
   - Activity list
   - Assumption log
   - Basis of estimates
   - Duration estimates
   - Lessons learned register
   - Milestone list
   - Project schedule network diagrams
   - Project team assignments
   - Resource breakdown structure
   - Resource calendars
   - Resource requirements
   - Risk register
3. **Agreements**
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Schedule network analysis**
2. **Critical path method**
3. **Resource optimization**
4. **Data analysis**
   - What-if scenario analysis
   - Simulation
5. **Leads and lags**
6. **Schedule compression**
7. **Project management information system**
8. **Agile release planning**

Outputs

1. **Schedule baseline**
2. **Project schedule**
3. **Schedule data**
4. **Project calendars**
5. **Change requests**
6. **Project management plan updates**
   - Schedule management plan
   - Cost baseline
7. **Project documents updates**
   - Activity attributes
   - Assumptions log
   - Duration estimates
   - Lessons learned register
   - Resource requirements
   - Risk register

7.1 Plan Cost Management

Inputs

1. **Project charter**
2. **Project management plan**
   - Schedule management plan
   - Risk management plan
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data analysis**
   - Alternative analysis
3. **Meetings**

Outputs

1. **Cost management plan**

7.2 Estimate Costs

Inputs

1. **Project management plan**
   - Cost management plan
   - Quality management plan
   - Scope baseline
2. **Project documents**
   - Lessons learned register
   - Project schedule
   - Resource requirements
   - Risk Register
3. **Enterprise environment factors**
4. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Analogous estimating**
3. **Parametric estimating**
4. **Bottom-up estimating**
5. **Three-point estimating**
6. **Data analysis**
   - Alternatives analysis
   - Reserve analysis
   - Cost of quality
7. **Project management information system**
8. **Decision making**
   - Voting

Outputs

1. **Cost estimates**
2. **Basis of estimates**
3. **Project documents updates**
   - Assumption log
   - Lessons learned register
   - Risk register

7.3 Determine Budget

Inputs

1. **Project management plan**
   - Cost management plan
   - Resource management plan
   - Scope baseline
2. **Project documents**
   - Basis of estimates
   - Cost estimates
   - Project schedule
   - Risk register
3. **Business documents**
   - Business case
   - Benefits management plan
4. **Agreements**
5. **Enterprise environmental factors**
6. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Cost aggregation**
3. **Data analysis**
   - Reserve analysis
4. **Historical information review**
5. **Funding limit reconciliation**
6. **Financing**

Outputs

1. **Cost baseline**
2. **Project funding requirements**
3. **Project documents updates**
   - Cost estimates
   - Project schedule
   - Risk register

8.1 Plan Quality Management

Inputs

1. **Project charter**
2. **Project management plan**
   - Requirements management plan
   - Risk management plan
   - Stakeholder engagement plan
   - Scope baseline
3. **Project documents**
   - Assumption log
   - Requirements documentation
   - Requirements traceability matrix
   - Risk register
   - Stakeholder register
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data gathering**
   - Benchmarking
   - Brainstorming
   - Interviews
3. **Data analysis**
   - Cost-benefit analysis
   - Regression analysis
   - Trend analysis
   - Variance analysis
4. **Decision making**
   - Multicriteria decision analysis
5. **Data representation**
   - Flowcharts
   - Logical data model
   - Matrix diagrams
   - Mind mapping
6. **Test and inspection planning**
7. **Meetings**

Outputs

1. **Quality management plan**
2. **Quality metrics**
3. **Project management plan updates**
   - Risk management plan
   - Scope baseline
4. **Project documents updates**
   - Lessons learned register
   - Requirements traceability matrix
   - Risk register
   - Stakeholder register

Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition*, Project Management Institute Inc., 2017, **Page 277**

9.1 Plan Resource Management

Inputs

1. **Project charter**
2. **Project management plan**
   - Quality management plan
   - Scope baseline
3. **Project documents**
   - Project schedule
   - Requirements documentation
   - Risk register
   - Stakeholder register
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data representation**
   - Hierarchical charts
   - Responsibility assignment matrix
   - Text-oriented formats
3. **Organizational theory**
4. **Meetings**

Outputs

1. **Resource management plan**
2. **Team Charter**
3. **Project documents updates**
   - Assumption log
   - Risk register

10.1 Plan Communications Management

skillsoft

Inputs

1. **Project charter**
2. **Project management plan**
   - Resource management plan
   - Stakeholder engagement plan
3. **Project documents**
   - Requirements documentation
   - Stakeholder register
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Communication requirements analysis**
3. **Communication technology**
4. **Communication models**
5. **Communication methods**
6. **Interpersonal and team skills**
   - Communication styles assessment
   - Political awareness
   - Cultural awareness
7. **Data representation**
   - Stakeholder engagement assessment matrix
8. **Meetings**

Outputs

1. **Communications management plan**
2. **Project management plan updates**
   - Stakeholder engagement plan
3. **Project documents updates**
   - Project schedule
   - Stakeholder register

11.1 Plan Risk Management

Inputs

1. **Project charter**
2. **Project management plan**
   - All components
3. **Project documents**
   - Stakeholder register
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data analysis**
   - Stakeholder analysis
3. **Meetings**

Outputs

1. **Risk management plan**

11.2 Identify Risks

Inputs

1. **Project management plan**
   - Requirements management plan
   - Schedule management plan
   - Cost management plan
   - Quality management plan
   - Resource management plan
   - Risk management plan
   - Scope, Schedule & Cost baselines
2. **Project documents**
   - Assumption log
   - Cost estimates
   - Duration estimates
   - Issue log
   - Lessons learned register
   - Requirements documentation
   - Resource requirements
   - Stakeholder register
3. **Agreements**
4. **Procurement documentation**
5. **Enterprise environmental factors**
6. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data gathering**
   - Brainstorming
   - Checklists
   - Interviews
3. **Data analysis**
   - Root cause analysis
   - Assumption and constraint analysis
   - SWOT analysis
   - Document analysis
4. **Interpersonal and team skills**
   - Facilitation
5. **Prompt lists**
6. **Meetings**

Outputs

1. **Risk register**
2. **Risk report**
3. **Project documents updates**
   - Assumption log
   - Issue log
   - Lessons learned register

Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition*, Project Management Institute Inc., 2017, **Page 409**

11.3 Perform Qualitative Risk Analysis

skillsoft

Inputs

1. **Project management plan**
   - Risk management plan
2. **Project documents**
   - Assumption log
   - Risk register
   - Stakeholder register
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data gathering**
   - Interviews
3. **Data analysis**
   - Risk data quality assessment
   - Risk probability and impact assessment
   - Assessment of other risk parameters
4. **Interpersonal and team skills**
   - Facilitation
5. **Risk categorization**
6. **Data representation**
   - Probability and impact matrix
   - Hierarchical charts
7. **Meetings**

Outputs

1. **Project documents updates**
   - Assumption log
   - Issue log
   - Risk register
   - Risk report

11.4 Perform Quantitative Risk Analysis

skillsoft

Inputs

1. **Project management plan**
   - Risk management plan
   - Scope baseline
   - Schedule baseline
   - Cost baseline
2. **Project documents**
   - Assumption log
   - Basis of estimates
   - Cost estimates
   - Cost forecasts
   - Duration estimates
   - Milestone list
   - Resource requirements
   - Risk register
   - Risk report
   - Schedule forecasts
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data gathering**
   - Interviews
3. **Interpersonal and team skills**
   - Facilitation
4. **Representations of uncertainty**
5. **Data analysis**
   - Simulations
   - Sensitivity analysis
   - Decision tree analysis
   - Influence diagrams

Outputs

1. **Project documents updates**
   - Risk report

11.5 Plan Risk Responses

Inputs

1. **Project management plan**
   - Resource management plan
   - Risk management plan
   - Cost baseline
2. **Project documents**
   - Lessons learned register
   - Project schedule
   - Project team assignments
   - Resource calendars
   - Risk register
   - Risk report
   - Stakeholder register
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data gathering**
   - Interviews
3. **Interpersonal and team skills**
   - Facilitation
4. **Strategies for threats**
5. **Strategies for opportunities**
6. **Contingent response strategies**
7. **Strategies for overall project risk**
8. **Data analysis**
   - Alternatives analysis
   - Cost-benefit analysis
9. **Decision making**
   - Multicriteria decision analysis

Outputs

1. **Change requests**
2. **Project management plan updates**
   - Schedule management plan
   - Cost management plan
   - Quality management plan
   - Resource management plan
   - Procurement management plan
   - Scope baseline
   - Schedule baseline
   - Cost baseline
3. **Project documents updates**
   - Assumption log
   - Cost forecasts
   - Lessons learned register
   - Project schedule
   - Project team assignments
   - Risk register
   - Risk report

12.1 Plan Procurement Management

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Inputs

1. **Project charter**
2. **Business documents**
   - Business case
   - Benefits management plan
3. **Project management plan**
   - Scope management plan
   - Quality management plan
   - Resource management plan
   - Scope baseline
4. **Project documents**
   - Milestone list
   - Project team assignments
   - Requirements documentation
   - Requirements traceability matrix
   - Resource requirements
   - Risk register
   - Stakeholder register
5. **Enterprise environmental factors**
6. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data gathering**
   - Market research
3. **Data analysis**
   - Make-or-buy analysis
4. **Source selection analysis**
5. **Meetings**

Outputs

1. **Procurement management plan**
2. **Procurement strategy**
3. **Bid documents**
4. **Procurement statement of work**
5. **Source selection criteria**
6. **Make-or-buy decisions**
7. **Independent cost estimates**
8. **Change requests**
9. **Project documents updates**
   - Lessons learned register
   - Milestone list
   - Requirements documentation
   - Requirements traceability matrix
   - Risk register
   - Stakeholder register
10. **Organizational process assets updates**

13.2 Plan Stakeholder Engagement

Inputs

1. **Project charter**
2. **Project management plan**
   - Resource management plan
   - Communications management plan
   - Risk management plan
3. **Project documents**
   - Assumption log
   - Change log
   - Issue log
   - Project schedule
   - Risk register
   - Stakeholder register
4. **Agreements**
5. **Enterprise environmental factors**
6. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data gathering**
   - Benchmarking
3. **Data analysis**
   - Assumption and constraint analysis
   - Root cause analysis
4. **Decision making**
   - Prioritization/ranking
5. **Data representation**
   - Mind mapping
   - Stakeholder engagement assessment matrix
6. **Meetings**

Outputs

1. **Stakeholder engagement plan**

4.3 Direct and Manage Project Work

Inputs

1. **Project management plan**
   - Any component
2. **Project documents**
   - Change log
   - Lessons learned register
   - Milestone list
   - Project communications
   - Project schedule
   - Requirements traceability matrix
   - Risk register
   - Risk report
3. **Approved change requests**
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Project management information system**
3. **Meetings**

Outputs

1. **Deliverables**
2. **Work performance data**
3. **Issue log**
4. **Change requests**
5. **Project management plan updates**
   - Any component
6. **Project documents updates**
   - Activity list
   - Assumption log
   - Lessons learned register
   - Requirements documentation
   - Risk register
   - Stakeholder register
7. **Organizational process assets updates**

4.4 Manage Project Knowledge

Inputs

1. **Project management plan**
   - All components
2. **Project documents**
   - Lessons learned register
   - Project team assignments
   - Resource breakdown structure
   - Stakeholder register
3. **Deliverables**
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Knowledge management**
3. **Information management**
4. **Interpersonal and team skills**
   - Active listening
   - Facilitation
   - Leadership
   - Networking
   - Political awareness

Outputs

1. **Lessons learned register**
2. **Project management plan updates**
   - Any component
3. **Organizational process assets updates**

8.2 Manage Quality

Inputs

1. **Project management plan**
   - Quality management plan
2. **Project documents**
   - Lessons learned register
   - Quality control measurements
   - Quality metrics
   - Risk report
3. **Organizational process assets**

Tools & Techniques

1. **Data gathering**
   - Checklists
2. **Data analysis**
   - Alternatives analysis
   - Document analysis
   - Process analysis
   - Root cause analysis
3. **Decision making**
   - Multicriteria decision analysis
4. **Data representation**
   - Affinity diagrams
   - Cause-and-effect diagrams
   - Flowcharts
   - Histograms
   - Matrix diagrams
   - Scatter diagrams
5. **Audits**
6. **Design for X**
7. **Problem solving**
8. **Quality improvement methods**

Outputs

1. **Quality reports**
2. **Test and evaluation documents**
3. **Change requests**
4. **Project management plan updates**
   - Quality management plan
   - Scope baseline
   - Schedule baseline
   - Cost baseline
5. **Project documents updates**
   - Issue log
   - Lessons learned register
   - Risk register

9.3 Acquire Resources

Inputs

1. **Project management plan**
   - Resource management plan
   - Procurement management plan
   - Cost baseline
2. **Project documents**
   - Project schedule
   - Resource calendars
   - Resource requirements
   - Stakeholder register
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Decision making**
   - Multicriteria decision analysis
2. **Interpersonal and team skills**
   - Negotiation
3. **Pre-assignment**
4. **Virtual teams**

Outputs

1. **Physical resource assignments**
2. **Project team assignments**
3. **Resource calendars**
4. **Change requests**
5. **Project management plan updates**
   - Resource management plan
   - Cost baseline
6. **Project documents updates**
   - Lessons learned register
   - Project schedule
   - Resource breakdown structure
   - Resource requirements
   - Risk register
   - Stakeholder register
7. **Enterprise environmental factors updates**
8. **Organizational process assets updates**

9.5 Manage Team

Inputs

1. **Project management plan**
   - Resource management plan
2. **Project documents**
   - Issue log
   - Lessons learned register
   - Project team assignments
   - Team charter
3. **Work performance reports**
4. **Team performance assessments**
5. **Enterprise environmental factors**
6. **Organizational process assets**

Tools & Techniques

1. **Interpersonal and team skills**
   - Conflict management
   - Decision making
   - Emotional intelligence
   - Influencing
   - Leadership
2. **Project management information system**

Outputs

1. **Change requests**
2. **Project management plan updates**
   - Resource management plan
   - Schedule baseline
   - Cost baseline
3. **Project documents updates**
   - Issue log
   - Lessons learned register
   - Project team assignments
4. **Enterprise environmental factors updates**

10.2 Manage Communications

Inputs

1. **Project management plan**
   - Resource management plan
   - Communication management plan
   - Stakeholder engagement plan
2. **Project documents**
   - Change log
   - Issue log
   - Lessons learned register
   - Quality report
   - Risk report
   - Stakeholder register
3. **Work performance reports**
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Communication technology**
2. **Communication methods**
3. **Communication skills**
   - Communication competence
   - Feedback
   - Nonverbal
   - Presentations
4. **Project management information system**
5. **Project reporting**
6. **Interpersonal and team skills**
   - Active listening
   - Conflict management
   - Cultural awareness
   - Meeting management
   - Networking
   - Political awareness
7. **Meetings**

Outputs

1. **Project communications**
2. **Project management plan updates**
   - Communications management plan
   - Stakeholder engagement plan
3. **Project documents updates**
   - Issue log
   - Lessons learned register
   - Project schedule
   - Risk register
   - Stakeholder register
4. **Organizational process assets updates**

12.2 Conduct Procurements

Inputs

1. **Project management plan**
   - Scope management plan
   - Requirements management plan
   - Communications management plan
   - Risk management plan
   - Procurement management plan
   - Configuration management plan
   - Cost baseline
2. **Project documents**
   - Lessons learned register
   - Project schedule
   - Requirements documentation
   - Risk register
   - Stakeholder register
3. **Procurement documentation**
4. **Seller proposals**
5. **Enterprise environmental factors**
6. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Advertising**
3. **Bidder conferences**
4. **Data analysis**
   - Proposal evaluation
5. **Interpersonal and team skills**
   - Negotiation

Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Sixth Edition*, Project Management Institute Inc., 2017, **Page 482**

Outputs

1. **Selected sellers**
2. **Agreements**
3. **Change requests**
4. **Project management plan updates**
   - Requirements management plan
   - Quality management plan
   - Communications management plan
   - Risk management plan
   - Procurement management plan
   - Scope baseline
   - Schedule baseline
   - Cost baseline
5. **Project documents updates**
   - Lessons learned register
   - Milestone list
   - Requirements documentation
   - Requirements traceability matrix
   - Risk register
   - Stakeholder register
6. **Organizational process assets updates**

Stakeholder

13.3 Manage Stakeholder Engagement

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Inputs

1. **Project management plan**
   - Communications management plan
   - Risk management plan
   - Stakeholder engagement plan
   - Change management plan
2. **Project documents**
   - Change log
   - Issue log
   - Lessons learned register
   - Stakeholder register
3. **Enterprise environmental factors**
4. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Communication skills**
   - Feedback
3. **Interpersonal and team skills**
   - Conflict management
   - Cultural awareness
   - Negotiation
   - Observation/conversation
   - Political awareness
4. **Ground rules**
5. **Meetings**

Outputs

1. **Change requests**
2. **Project management plan updates**
   - Communications management plan
   - Stakeholder engagement plan
3. **Project documents updates**
   - Change log
   - Issue log
   - Lessons learned register
   - Stakeholder register

4.5 Monitor and Control Project Work

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Inputs

1. **Project management plan**
   - Any component
2. **Project documents**
   - Assumption log
   - Basis of estimates
   - Cost forecasts
   - Issue log
   - Lessons learned register
   - Milestone list
   - Quality reports
   - Risk register
   - Risk report
   - Schedule forecasts
3. **Work performance information**
4. **Agreements**
5. **Enterprise environmental factors**
6. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data analysis**
   - Alternatives analysis
   - Cost-benefit analysis
   - Earned value analysis
   - Root cause analysis
   - Trend analysis
   - Variance analysis
3. **Decision making**
   - Voting
4. **Meetings**

Outputs

1. **Work performance reports**
2. **Change requests**
3. **Project management plan updates**
   - Any component
4. **Project documents updates**
   - Cost forecasts
   - Issue log
   - Lessons learned register
   - Risk register
   - Schedule forecasts

4.6 Perform Integrated Change Control

Inputs

1. **Project management plan**
   - Change management plan
   - Configuration management plan
   - Scope baseline
   - Schedule baseline
   - Cost baseline
2. **Project documents**
   - Basis of estimates
   - Requirements traceability matrix
   - Risk report
3. **Work performance reports**
4. **Change requests**
5. **Enterprise environmental factors**
6. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Change control tools**
3. **Data analysis**
   - Alternatives analysis
   - Cost-benefit analysis
4. **Decision making**
   - Voting
   - Autocratic decision making
   - Multicriteria decision analysis
5. **Meetings**

Outputs

1. **Approved change requests**
2. **Project management plan updates**
   - Any component
3. **Project documents updates**
   - Change log

6.6 Control Schedule

Inputs

1. **Project management plan**
   - Schedule management plan
   - Schedule baseline
   - Scope baseline
   - Performance measurement baseline
2. **Project documents**
   - Lessons learned register
   - Project calendars
   - Project schedule
   - Resource calendars
   - Schedule data
3. **Work performance data**
4. **Organizational process assets**

Tools & Techniques

1. **Data analysis**
   - Earned value analysis
   - Iteration burndown chart
   - Performance reviews
   - Trend analysis
   - Variance analysis
   - What-if scenario analysis
2. **Critical path method**
3. **Project management information system**
4. **Resource optimization**
5. **Leads and lags**
6. **Schedule compression**

Outputs

1. **Work performance information**
2. **Schedule forecasts**
3. **Change requests**
4. **Project management plan updates**
   - Schedule management plan
   - Schedule baseline
   - Cost baseline
   - Performance measurement baseline
5. **Project documents updates**
   - Assumption log
   - Basis of estimates
   - Lessons learned register
   - Project schedule
   - Resource calendars
   - Risk register
   - Schedule data

7.4 Control Costs

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Inputs

1. **Project management plan**
   - Cost management plan
   - Cost baseline
   - Performance measurement baseline
2. **Project documents**
   - Lessons learned register
3. **Project funding requirements**
4. **Work performance data**
5. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data analysis**
   - Earned value analysis
   - Variance analysis
   - Trend analysis
   - Reserve analysis
3. **To-complete performance index**
4. **Project management information system**

Outputs

1. **Work performance information**
2. **Cost forecasts**
3. **Change requests**
4. **Project management plan updates**
   - Cost management plan
   - Cost baseline
   - Performance measurement baseline
5. **Project documents updates**
   - Assumption log
   - Basis of estimates
   - Cost estimates
   - Lessons learned register
   - Risk register

8.3 Control Quality

Inputs

1. **Project management plan**
   - Quality management plan
2. **Project documents**
   - Lessons learned register
   - Quality metrics
   - Test and evaluation documents
3. **Approved change requests**
4. **Deliverables**
5. **Work performance data**
6. **Enterprise environmental factors**
7. **Organizational process assets**

Tools & Techniques

1. **Data gathering**
   - Checklists
   - Check sheets
   - Statistical sampling
   - Questionnaires and surveys
2. **Data analysis**
   - Performance reviews
   - Root cause analysis
3. **Inspection**
4. **Testing/product evaluations**
5. **Data representation**
   - Cause-and-effect diagrams
   - Control charts
   - Histogram
   - Scatter diagrams
6. **Meetings**

Outputs

1. **Quality control measurements**
2. **Verified deliverables**
3. **Work performance information**
4. **Change Requests**
5. **Project management plan updates**
   - Quality management plan
6. **Project documents updates**
   - Issue log
   - Lessons learned register
   - Risk register
   - Test and evaluation documents

Scope

5.5 Validate Scope

Inputs

1. **Project management plan**
   - Scope management plan
   - Requirements management plan
   - Scope baseline
2. **Project documents**
   - Lessons learned register
   - Quality reports
   - Requirements documentation
   - Requirements traceability matrix
3. **Verified deliverables**
4. **Work performance data**

Tools & Techniques

1. **Inspection**
2. **Decision making**
   - Voting

Outputs

1. **Accepted deliverables**
2. **Work performance information**
3. **Change requests**
4. **Project document updates**
   - Lessons learned register
   - Requirements documentation
   - Requirements traceability matrix

9.6 Control Resources

Inputs

1. **Project management plan**
   - Resource management plan
2. **Project documents**
   - Issue log
   - Lessons learned register
   - Physical resource assignments
   - Project schedule
   - Resource breakdown structure
   - Resource requirements
   - Risk report
3. **Work performance data**
4. **Agreements**
5. **Organizational process assets**

Tools & Techniques

1. **Data analysis**
   - Alternatives analysis
   - Cost-benefit analysis
   - Performance reviews
   - Trend analysis
2. **Problem solving**
3. **Interpersonal and team skills**
   - Negotiation
   - Influencing
4. **Project management information system**

Outputs

1. **Work performance information**
2. **Change requests**
3. **Project management plan updates**
   - Resource management plan
   - Schedule baseline
   - Cost baseline
4. **Project documents updates**
   - Assumption log
   - Issue log
   - Lessons learned register
   - Physical resource assignments
   - Resource breakdown structure
   - Risk register

10.3 Monitor Communications

Inputs

1. **Project management plan**
   - Resource management plan
   - Communications management plan
   - Stakeholder management plan
2. **Project documents**
   - Issue log
   - Lessons learned register
   - Project communications
3. **Work performance data**
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Project management information system**
3. **Data analysis**
   - Stakeholder engagement assessment matrix
4. **Interpersonal and team skills**
   - Observation/conversation
5. **Meetings**

Outputs

1. **Work performance information**
2. **Change requests**
3. **Project management plan updates**
   - Communications management plan
   - Stakeholder engagement plan
4. **Final Project documents updates**
   - Issue log
   - Lessons learned register
   - Stakeholder register

Risk

11.7 Monitor Risks

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Inputs

1. **Project management plan**
   - Risk management plan
2. **Project documents**
   - Issue log
   - Lessons learned register
   - Risk register
   - Risk report
3. **Work performance data**
4. **Work performance reports**

Tools & Techniques

1. **Data analysis**
   - Technical performance analysis
   - Reserve analysis
2. **Audits**
3. **Meetings**

Outputs

1. **Work performance information**
2. **Change requests**
3. **Project management plan updates**
   - Any component
4. **Project documents updates**
   - Assumption log
   - Issue log
   - Lessons learned register
   - Risk register
   - Risk report
5. **Organizational process assets updates**

12.3 Control Procurements

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Inputs

1. **Project management plan**
   - All components
2. **Project documents**
   - Assumption log
   - Lessons learned register
   - Milestone list
   - Quality reports
   - Requirements documentation
   - Requirements traceability matrix
   - Risk register
   - Stakeholder register
3. **Agreements**
4. **Procurement documentation**
5. **Approved change requests**
6. **Work performance data**
7. **Enterprise environmental factors**
8. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Claims administration**
3. **Data analysis**
   - Performance reviews
   - Earned value analysis
   - Trend analysis
4. **Inspection**
5. **Audits**

Outputs

1. **Closed procurements**
2. **Work performance information**
3. **Procurement documentation updates**
4. **Change requests**
5. **Project management plan updates**
   - Risk management plan
   - Procurement management plan
   - Schedule baseline
   - Cost baseline
6. **Project documents updates**
   - Lessons learned register
   - Resource requirements
   - Requirements traceability matrix
   - Risk register
   - Stakeholder register
7. **Organizational process assets updates**

Stakeholder

13.4 Monitor Stakeholder Engagement

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Inputs

1. **Project management plan**
   - Resource management plan
   - Communications management plan
   - Stakeholder engagement plan
2. **Project documents**
   - Issue log
   - Lessons learned register
   - Project communications
   - Risk register
   - Stakeholder register
3. **Work performance data**
4. **Enterprise environmental factors**
5. **Organizational process assets**

Tools & Techniques

1. **Data analysis**
   - Alternatives analysis
   - Root cause analysis
   - Stakeholder analysis
2. **Decision making**
   - Multicriteria decision analysis
   - Voting
3. **Data representation**
   - Stakeholder engagement assessment matrix
4. **Communication skills**
   - Feedback
   - Presentations
5. **Interpersonal and team skills**
   - Active listening
   - Cultural awareness
   - Leadership
   - Networking
   - Political awareness
6. **Meetings**

Outputs

1. **Work performance information**
2. **Change requests**
3. **Project management plan updates**
   - Resource management plan
   - Communications management plan
   - Stakeholder engagement plan
4. **Project documents updates**
   - Issue log
   - Lessons learned register
   - Risk register
   - Stakeholder register

Closing **Integration** 4.7 Close Project or Phase

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Inputs

1. **Project charter**
2. **Project management plan**
   - All components
3. **Project documents**
   - Assumption log
   - Basis of estimates
   - Change & issue logs
   - Lessons learned register
   - Milestone list
   - Project communications
   - Quality control measurements
   - Quality reports
   - Requirements documentation
   - Risk register & risk report
4. **Accepted deliverables**
5. **Business documents**
   - Business case
   - Benefits management plan
6. **Agreements**
7. **Procurement documentation**
8. **Organizational process assets**

Tools & Techniques

1. **Expert judgment**
2. **Data analysis**
   - Document analysis
   - Regression analysis
   - Trend analysis
   - Variance analysis
3. **Meetings**

Outputs

1. **Project documents updates**
   - Lessons learned register
2. **Final product, service, or result transition**
3. **Final report**
4. **Organizational process assets updates**

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Inputs, Tools and Techniques, and Outputs (ITTOs)