
PMP 2023 Complete Notes

Highlighted parts usually appear in tricky questions, reading the entire notes will help you understand the mindset. If don't have much time to review the entire notes, just focus on the highlighted areas and you will pass too!

Chapter	Section	Notes
Pmbok guide	Environments which projects operate	<ul style="list-style-type: none">• EEF<ul style="list-style-type: none">• Internal<ul style="list-style-type: none">◦ Company required• External<ul style="list-style-type: none">◦ Law, contracts• Organization process assets (OPA)<ul style="list-style-type: none">• Organizational knowledge repositories<ul style="list-style-type: none">◦ History• Organizational systems<ul style="list-style-type: none">• Company structure• there will be three domains in the new PMP exam content (people, process, and business environment).
	Role of project manager	<ul style="list-style-type: none">• Involve before and after• Lead to achieve• Balance objective• Communication• Contribute to business value
	Project integration management	<ul style="list-style-type: none">• Project charter (have to be first)<ul style="list-style-type: none">• Business case and benefit management plan• Organization strategy objectives• Management plan• Manage work• Manage knowledge• Monitor and control• Perform control

		<ul style="list-style-type: none"> • close
	Project scope management	<ul style="list-style-type: none"> • Scope management (how to do it) <ul style="list-style-type: none"> • Collect requirement • Define scope • Create Wbs-work breakdown structure <ul style="list-style-type: none"> ◦ Wbs dictionary <ul style="list-style-type: none"> • has all details about each work package, such as who is doing it, where it's getting done, and its cost. • Control scope-keep things on target, change control • Validate scope-customer confirms
	Project schedule management	<ul style="list-style-type: none"> • Plan • Define activities • Sequence activities • Estimate duration • Develop • control
	Cost management	<ul style="list-style-type: none"> • Plan • Estimate • Determine budget <ul style="list-style-type: none"> • Include seek funding to finance the project • Total fund or cost budget = cost baseline + management reserves • Cost baseline = project cost + contingency reserves • Contingent reserve - money related to risk- for known risk <ul style="list-style-type: none"> • "Contingency reserve" is associated with a known-unknown and is usually added to the project management plan. • Management reserve - money or time reserved <ul style="list-style-type: none"> • Within budget, not part of the schedule baseline, but it's in the overall project duration • A management reserve is generally for an unknown-unknown and not added to the project management plan. •
	Quality control	<ul style="list-style-type: none"> • Manage quality - happen during Executing <ul style="list-style-type: none"> • Process that PM follow to ensure and improve the quality management processes the project will follow to produce a quality deliverable • PM conduct audits and process analysis • Defect prevention • Control quality - happen during monitoring and controlling, <ul style="list-style-type: none"> • Inspect- before customer comes in check

		<ul style="list-style-type: none"> • Defect identification • OPM3 (Organization Project Management Maturity Model) <ul style="list-style-type: none"> • PMI's organizational project management maturity model. • This model helps to determine the level of ability of an organization to deliver the desired strategic outcomes in a reliable, controllable, and predictable manner • strategy execution framework
	Resource management	<ul style="list-style-type: none"> • Plan • Estimate activities resources- schedule , cost • Acquire • Develop team • Manage team • control
	Communication management	<ul style="list-style-type: none"> • Plan • Management • monitor
	Risk management	<ul style="list-style-type: none"> • Identify • Qualitative risk analysis • Quantitative risk • Response plan and implement • monitor
	Procurement management	<ul style="list-style-type: none"> • Plan • Conduct - <ul style="list-style-type: none"> • Acquire resource • control
	Stakeholder management	<ul style="list-style-type: none"> • Identify • Plan • Management • Monitor
Project management foundations	Temporary projects	
	Drive change	<ul style="list-style-type: none"> • Move, add, change, delete
	Why do a project, aka initiation	<ul style="list-style-type: none"> • Tangible • Intangible

	context (enable business value)	
	Who projects are created	<ul style="list-style-type: none"> • Business value: <ul style="list-style-type: none"> • Obligate to law • Stakeholder requests • Tech advance • Create/improve/fix existing things
	Define project management	<ul style="list-style-type: none"> • 5 process groups <ul style="list-style-type: none"> • Initiating • Planning • Executing • Monitoring and controlling • Closing • Progressive elaboration <ul style="list-style-type: none"> • Idea • Formulate • Business case-what is the value • Feasibility • case
	Application area	<ul style="list-style-type: none"> • Different industry
	Life cycle	<ul style="list-style-type: none"> • PM life cycle • Project life cycle <ul style="list-style-type: none"> • Different for each project
Related area of PM	Program management	<ul style="list-style-type: none"> • To gain higher control
	Portfolio management	<ul style="list-style-type: none"> • Include program, project, operation • Max ROI • Sub portfolio <ul style="list-style-type: none"> • For large organization
	PMO	<ul style="list-style-type: none"> • Role <ul style="list-style-type: none"> • Support, • Manage resources • Audits • Coaching mentoring training • Develop processes and procedure

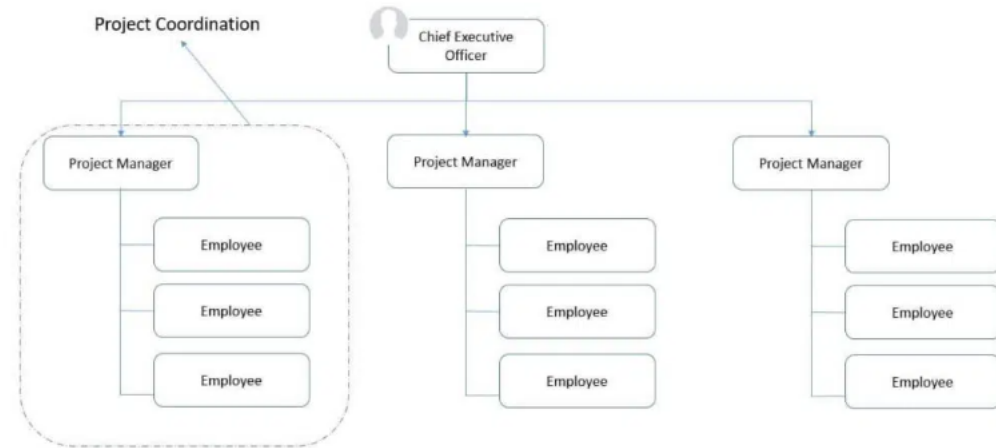
		<ul style="list-style-type: none"> • Facilitating communication • Type <ul style="list-style-type: none"> • Supportive • Controlling <ul style="list-style-type: none"> ◦ Moderate level of control, template and framework • Directive <ul style="list-style-type: none"> ◦ Assign PM, PM is part of the PMO ◦ High control
	Project vs operations	<ul style="list-style-type: none"> • Project <ul style="list-style-type: none"> • Short term • Operations <ul style="list-style-type: none"> • ongoing
	OPM (organization project management) and strategies	<p>Consistency with approach</p> <ul style="list-style-type: none"> • Executive - why • Functional management - how • Operation - what
	Project environment	
Project process group and knowledge areas	Process groups	<ul style="list-style-type: none"> • 5 process groups <ul style="list-style-type: none"> • Initiating • Planning • Executing • Monitoring and controlling • Closing • project management Knowledge Area is subdivided to each processes
	Work performance data, information, reports	<ul style="list-style-type: none"> • Data <ul style="list-style-type: none"> • Raw data • Status of project • Work performance information <ul style="list-style-type: none"> • Analyzed data • Useable info • Status to actions • • Reports
	Tailoring process	<ul style="list-style-type: none"> • What process • What depth • Not every process needed • Larger project will need more process

	Adaptive Environment	<ul style="list-style-type: none"> • Predictive <ul style="list-style-type: none"> • Predict, waterfall, changes are controlled • Adaptive <ul style="list-style-type: none"> • Agile, change driven,
	Business Document	<ul style="list-style-type: none"> • Phase gate - gate review • Actual performance compare to business document • Decision of comparison
	Business Case	<ul style="list-style-type: none"> • Economic feasibility study - does it make sense to invest • Validity of benefit - does it actually going to bring business value • Future PM decision • Maintain business case • Project sponsor maintain business case • PM provide recommendations • Can be program level • What prompt the need • Document problem or opportunity • Stakeholders affected • Identify the scope
	Project Benefit Management	<ul style="list-style-type: none"> • How you create, maximize, sustain project benefit • Target benefits - tangible and intangible • Strategic alignment • Timeframe • Metrics - how do you measure • Assumption - • Risk
Project Environment	Enterprise Environmental Factors - restrict you	<ul style="list-style-type: none"> • PMs have no control over EEF • EEF come from outside of the project • EEF <ul style="list-style-type: none"> • Internal <ul style="list-style-type: none"> ◦ Company required ◦ cultural • External <ul style="list-style-type: none"> ◦ Law, contracts • Organizational systems <ul style="list-style-type: none"> • Company structure

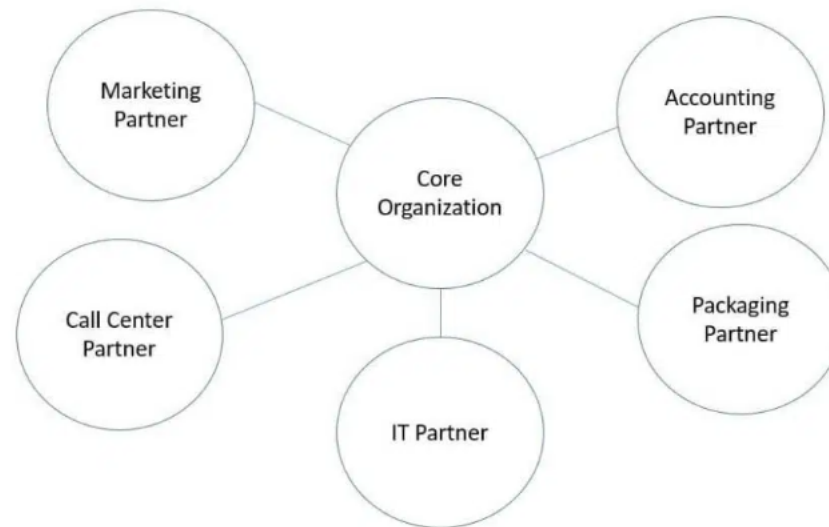
<p>Organization process assets (OPA) - helps you</p>		<ul style="list-style-type: none"> • Organization process assets (OPA) <ul style="list-style-type: none"> • Resources within an organization • Common OPAs <ul style="list-style-type: none"> ◦ Policies, standards • Organizational knowledge repositories <ul style="list-style-type: none"> ◦ History ◦ How <ul style="list-style-type: none"> • Cataloging • Archiving <ul style="list-style-type: none"> ▪ Always archive at closure • Retrievable
<p>Processes, Policies, and Procedures</p>		<ul style="list-style-type: none"> • Internal processes
<p>Organization systems</p>		<ul style="list-style-type: none"> • System dynamics <ul style="list-style-type: none"> • Relationship between components within company
<p>Organizational governance frameworks</p>		<ul style="list-style-type: none"> • Governance --Rules • Framework <ul style="list-style-type: none"> • Structure • Cultural norm • Influence <ul style="list-style-type: none"> ◦ Objectives ◦ Risk ◦ performance
<p>Management elements</p>		<ul style="list-style-type: none"> • Some governance are shared, everyone must tailor • Organization and project management <ul style="list-style-type: none"> • Complete project for others <ul style="list-style-type: none"> ◦ Client vendor relationship • Complete project internally <ul style="list-style-type: none"> ◦ Management by projects • Complete project as needed <ul style="list-style-type: none"> ◦ Lack of project support systems <ul style="list-style-type: none"> • Not do this very often • Internal/external customers

Organization structure types

- How organization is built
- Power shift between project manager and functional manager
 - Organic or simple
 - Small org do big work
 - PM like coordinator
 - Budget: owner
 - Functional (centralized)
 - Usually a simple task, part time
 - Resource from within company, everyone reports to the same person
 - Budget: Functional Manager
 - Multidivisional - multiple functional organization as division. PM to coordinate, functional manager still makes decisions
 - Replication of roles
 - Part time resource
 - Part time admin
 - Budget: Functional Manager
 - Weak matrix - similar to functional
 - Team from all over the company
 - Part time resources
 - Budget: Functional Manager
 - Balanced matrix
 - Part time PM,
 - Share management
 - Budget: Functional Manager/PM
 - Strong matrix
 - Full time PM and admin
 - Budget: PM
 - Project oriented - team based structure, usually in small-medium size organization
 - Everyone work on same project full time
 - Complete power
 - PM manage budget




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- Virtual - can be partners outside of the firm too
 - Communication can be challenge
 - PM low to moderate authority
 - Budget: Functional Manager/PM



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- Hybrid
 - Blend of other types
- PMO

		<ul style="list-style-type: none"> ◦ Uniform approach to all projects ◦ PM have high authority, full time team reports to them
	PMO	<ul style="list-style-type: none"> • Uniform approach • Support project manager
Role of the PM	Definition	<ul style="list-style-type: none"> • Communication <ul style="list-style-type: none"> • Formal • Informal • Vertical <ul style="list-style-type: none"> ◦ Follow flowchart • Horizontal <ul style="list-style-type: none"> ◦ With peer • Problem solve
	PM influence	<ul style="list-style-type: none"> • PM influenced by and influence <ul style="list-style-type: none"> • Project team • Organizations manager: functional manager • PMO • Steering Committee <ul style="list-style-type: none"> ◦ Planning stage, set vision
	PM Competencies	<p>Competency Model</p> <ul style="list-style-type: none"> • Unconsciously incompetent <ul style="list-style-type: none"> ◦ Not know you don't have a skill • Consciously incompetent <ul style="list-style-type: none"> ◦ Aware not have a skill • Consciously competent <ul style="list-style-type: none"> ◦ Learn and practice the skill • Unconsciously competent <ul style="list-style-type: none"> ◦ Do skill without thinking • Chosen conscious competence <ul style="list-style-type: none"> ◦ Practice and maintain the skill <p>Three value</p>
	Leadership styles	<ul style="list-style-type: none"> • Transactional <ul style="list-style-type: none"> • Rewards and punishments • Servant leader <ul style="list-style-type: none"> • Carry food and water • Empower team • Remove impediments • Provide tools

		<ul style="list-style-type: none"> • Laissez faire lead <ul style="list-style-type: none"> • Hands off • Transformational <ul style="list-style-type: none"> • Leader style manager • Charismatic <ul style="list-style-type: none"> • Do what I do • high energy and is very enthusiastic • Interactional <ul style="list-style-type: none"> • Mix transactional, transformational and charismatic
	Power	<ul style="list-style-type: none"> • Positional power • Informational power <ul style="list-style-type: none"> • Control data and info • Referent power <ul style="list-style-type: none"> • Already have relationship • Situational power <ul style="list-style-type: none"> • Things changed and gave power • Personal power • Reward power <ul style="list-style-type: none"> • Power to reward • Ingratiating <ul style="list-style-type: none"> • Flatter • Pressure power <ul style="list-style-type: none"> • Strict • Guilt <ul style="list-style-type: none"> • Feel guilty • Persuasive power • Avoiding <ul style="list-style-type: none"> • You figure out
	Management vs leadership	Need both
	Performing integration	<ul style="list-style-type: none"> • Performing integration <ul style="list-style-type: none"> • Have to support goals • Process integration <ul style="list-style-type: none"> • Predefined • Cognitive level <ul style="list-style-type: none"> • Experience, leadership ability for PM • Context level integration <ul style="list-style-type: none"> • Tech level changing

	Talent triangle	 <ul style="list-style-type: none"> • Strategic and business management is about having knowledge about the organization such as its goals, mission, competition. • Technical Project Management is about the skills to apply project management knowledge. Such as managing cost, risk and schedule.
Project Integration Management -- touches all the process group)- PM's job	Trends and factors	<ul style="list-style-type: none"> • Alignment of benefits • Create a PM plan • Knowledge management • Manage performance and changes • Manage phase transition, --HR • Trends <ul style="list-style-type: none"> • Automated tools • Visual tools • Business case development, benefit management • Hybrid- adaptive predictive
	Tailoring	<ul style="list-style-type: none"> • Tailor processes • Need to be allowed by governance • Benefit <ul style="list-style-type: none"> • Priority
	Adaptive environment	<ul style="list-style-type: none"> • Team member <ul style="list-style-type: none"> • local domain experts • Decide how plan and components should integrate • Share control • Usually are generalists

		<ul style="list-style-type: none"> • PM <ul style="list-style-type: none"> • Servant leadership • Collaborative decision making environment
	Project Charter	<ul style="list-style-type: none"> • Inputs • Tools & techniques • Output <ul style="list-style-type: none"> • Assumption log • Develop <ul style="list-style-type: none"> • Project sponsor has to authorize • Its possible multiple charters • Enterprise environmental factor <ul style="list-style-type: none"> • Stakeholder expectation and risk threshold -- tolerance level -- high priority low tolerance • Organizational process assets <ul style="list-style-type: none"> • Framework • Monitor and report methods • Interpersonal and team skills <ul style="list-style-type: none"> • Conflict management • Facilitation • Meeting management
	Benefit Measurement	<ul style="list-style-type: none"> • Murder board <ul style="list-style-type: none"> • Committee kills it before it starts • $PV = FV / (1+i)^n$
	Assumption log	<ul style="list-style-type: none"> • Assumption + constraints
	Project management plan	<ul style="list-style-type: none"> • Ongoing • Have subsidiary plan • Should be baselined <ul style="list-style-type: none"> • New changes after baseline need change control • Skills • Kick off meeting <ul style="list-style-type: none"> • Small project <ul style="list-style-type: none"> ◦ Kick off happen after initiation, in planning • Large project <ul style="list-style-type: none"> ◦ Project management team does planning ◦ Kickoff meeting during executing • Multiphase <ul style="list-style-type: none"> ◦ Kickoff meeting at each phase

		<ul style="list-style-type: none"> • Content <ul style="list-style-type: none"> • Scope • Requirement • Schedule • Cost • Quality • Resource • Communication • Risk • Procurement • Stakeholder • Baseline <ul style="list-style-type: none"> • Scope
	Direct and manage project work	<ul style="list-style-type: none"> •
	Action as a PM	<ul style="list-style-type: none"> • Corrective action <ul style="list-style-type: none"> • Realign work with plan • Preventive action <ul style="list-style-type: none"> • Ensure future performance <ul style="list-style-type: none"> ◦ Safety and training • Defect repair <ul style="list-style-type: none"> • Fix the problem • Paperwork <ul style="list-style-type: none"> • Document change control <ul style="list-style-type: none"> ◦ Activity list ◦ Assumption log ◦ Lessons learned ◦ Requirement documentation ◦ Risk register ◦ Stakeholder register • OPA
	Deliverables	<ul style="list-style-type: none"> • Equipment that we purchase and we keep • PM plan • Configuration management to control version

	Work Performance Data	<ul style="list-style-type: none"> • Analyzed and become information
	Manage Project Knowledge	<ul style="list-style-type: none"> • Knowledge that to openly share • Explicit knowledge - easy, from reading, picture or numbers • Tacit knowledge - deeper understanding, from insight and experience • Techniques <ul style="list-style-type: none"> • Storytelling • Knowledge fairs and café - lunch bag session
	Monitor and control the work	<ul style="list-style-type: none"> • Data analysis <ul style="list-style-type: none"> • Alternative analysis <ul style="list-style-type: none"> ◦ Corrective, prevent action • Cost benefit analysis • Earned value analysis <ul style="list-style-type: none"> ◦ Formula will show project performance • Root cause analysis • Trend analysis <ul style="list-style-type: none"> ◦ Recurring problem, threats, opportunities • Variance analysis <ul style="list-style-type: none"> ◦ Difference vs experience
	Integrated change control	<ul style="list-style-type: none"> • PM's responsibility • Happen after baseline • Process can create change request <ul style="list-style-type: none"> • Late • Configuration control <ul style="list-style-type: none"> • Scope change • Configuration <ul style="list-style-type: none"> ◦ Identification <ul style="list-style-type: none"> • All the components of the products ◦ Status accounting <ul style="list-style-type: none"> • Product info ◦ Verify and auditing • Manage product change <ul style="list-style-type: none"> • Unapproved change • Scope creep <ul style="list-style-type: none"> ◦ Tiny change bypass the change control

		<ul style="list-style-type: none"> ◦ Project poison • Gold plating <ul style="list-style-type: none"> ◦ Extra money and I decide to make something • Decision making <ul style="list-style-type: none"> • Plurality - most people picked deferred • Autocratic - one person • Multicriteria decision <ul style="list-style-type: none"> ◦ Lots of factor, predefined ◦
	Closing	<ul style="list-style-type: none"> • Admin closure <ul style="list-style-type: none"> • Financial, personnel, extra material, reallocating resources, create report • Contractual agreement <ul style="list-style-type: none"> • Confirm the acceptance, finalize claim
Managing Project Scope	Planning scope management	<ul style="list-style-type: none"> • Scope management plan <ul style="list-style-type: none"> • Does not create scope statement, it's for how to define the scope • Charter is key input • Will decide how work break down (WBS) will be created • Scope baseline = scope statement+ WBS + WBS dictionary <ul style="list-style-type: none"> ◦ Scope Statement <ul style="list-style-type: none"> • what, why, who, where, and how and in combination with the WBS provides a detailed description of what must be accomplished. • Include acceptance criteria ◦ Wbs dictionary <ul style="list-style-type: none"> • has all details about each work package, such as who is doing it, where it's getting done, and its cost. • Requirement management plan <ul style="list-style-type: none"> • Configuration management • Requirement prioritization process • how to manage the project requirements, • RTM--Requirement traceability matrix -- requirement->scope->deliverable <ul style="list-style-type: none"> ◦ Will include who made the requirement • Requirements documentation includes the project and the product quality requirements.
	Project scope vs product scope	<ul style="list-style-type: none"> • Product scope <ul style="list-style-type: none"> • Feature and function • Project scope <ul style="list-style-type: none"> • Required work to satisfy objectives • Scope and project life cycle <ul style="list-style-type: none"> •

	trends	<ul style="list-style-type: none"> • BA <ul style="list-style-type: none"> • Define manage and control • Requirement responsibilities <ul style="list-style-type: none"> ◦ PM has delivery responsibilities
	Adaptive environment	<ul style="list-style-type: none"> • PO owns the backlog
	Collect requirement	<ul style="list-style-type: none"> • Benchmarking <ul style="list-style-type: none"> • Compare two or more system • Affinity Diagram <ul style="list-style-type: none"> • Creativity • Small group • Nominal group <ul style="list-style-type: none"> • Generate and vote • Each person brainstorm • Add idea to a white board • Idea each discussed • Vote • Joint application design- PI Planning • Quality function deployment <ul style="list-style-type: none"> • Voice of customer
	Manage requirement	<ul style="list-style-type: none"> • Business <ul style="list-style-type: none"> • High level • Stakeholder <ul style="list-style-type: none"> • Most important • Solution • Transition <ul style="list-style-type: none"> • Operational • Project <ul style="list-style-type: none"> • Processes • Quality <ul style="list-style-type: none"> • Validate
	WBS	<ul style="list-style-type: none"> • Smallest item is work package • Control accounts <ul style="list-style-type: none"> • Cap of budget • Code of accounts <ul style="list-style-type: none"> • Numbering system
	Validate	<ul style="list-style-type: none"> • Quality control - keep mistake out of customer's hand
	Control Scope	<ul style="list-style-type: none"> • Variance analysis

		<ul style="list-style-type: none"> • Trend analysis
	Process	<ul style="list-style-type: none"> • Control Scope <ul style="list-style-type: none"> • compare the work that has been completed to the project management plan to see if they line up. If there is a variance, the project manager should initiate actions to fix the variance. • Validate Scope <ul style="list-style-type: none"> • stakeholders formally accept the project deliverables
Project schedule management	Trends	<ul style="list-style-type: none"> • Might spend time on knowledge • Rolling wave planning <ul style="list-style-type: none"> • future work is decomposed as the work gets closer. • Lean manufacturing <ul style="list-style-type: none"> • Assignment give to team as available • Project dimensions <ul style="list-style-type: none"> • Logistics
	Adaptive environment	<ul style="list-style-type: none"> • Theory of constraints <ul style="list-style-type: none"> • Most limiting factors
	Schedule management plan	<ul style="list-style-type: none"> • EEF <ul style="list-style-type: none"> • Commercial database • Scheduling software • Schedule model <ul style="list-style-type: none"> • Flow of your activities • Level of accuracy • Procedure link <ul style="list-style-type: none"> • How to get resources • Schedule maintenance • Control threshold <ul style="list-style-type: none"> • willing to allow before any action is required • Rules for performance measurement
	Project activities	<ul style="list-style-type: none"> • Product scope- Project scope - WBS-work package-activity list • Activity attributes • Milestone • 8/80 rule <ul style="list-style-type: none"> • 8-80hour size work • Inputs for project activities <ul style="list-style-type: none"> • Scope baseline • Enterprise environment factors

		<ul style="list-style-type: none"> • Organizational process asset • Control accounts <ul style="list-style-type: none"> • Scope cost schedule, deadline • Planning package <ul style="list-style-type: none"> • Decisions leads to the kitchen
Activity list		<ul style="list-style-type: none"> • Leads - lead time • Lag - delayed time • Activity attributes <ul style="list-style-type: none"> • Resource requirement • Imposed dates <ul style="list-style-type: none"> ◦ deadlines • Constraints and assumptions • LOE are support activities • Discrete effort <ul style="list-style-type: none"> • Work for product • Apportioned effort <ul style="list-style-type: none"> • Project management work
Sequencing project activities		<ul style="list-style-type: none"> • Dependencies <ul style="list-style-type: none"> • Mandatory-hard • Discretionary - soft • External • Internal - type of hard logic
Network diagram		<ul style="list-style-type: none"> • Precedence diagramming method (PDM) <ul style="list-style-type: none"> • map out all the tasks in a project to plan the order in which they will be executed. • construct a schedule in which the activities are represented graphically using nodes and are linked based on their relationship. • Critical path is the shortest to completion <ul style="list-style-type: none"> ◦ Multiple means high risk <div data-bbox="774 1157 1236 1398" data-label="Diagram"> <pre> graph LR A[7] --> C[10] A --> B[15] C --> D[12] B --> F[17] D --> G[6] F --> H[11] G --> I[13] H --> I[13] </pre> </div> <ul style="list-style-type: none"> • Milestone chart <ul style="list-style-type: none"> • high-level view of major accomplishments on a project. These are best used when presenting a quick view of data and the project schedule to management personnel.

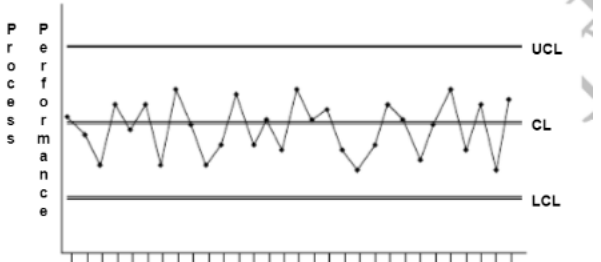


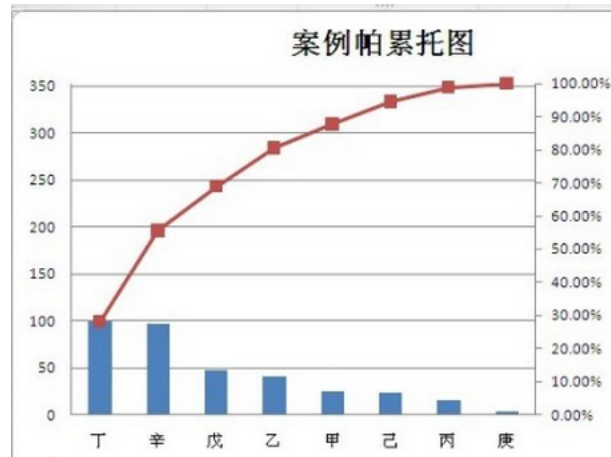
		<ul style="list-style-type: none"> •
Estimate duration	<ul style="list-style-type: none"> • How <ul style="list-style-type: none"> • Identify>sequencing>define>estimate • Low of diminishing returns <ul style="list-style-type: none"> • Can't continue add labor to • Parkinson's law/student syndrome <ul style="list-style-type: none"> • Work will expand to fill the time 	
Analogous Estimating	<ul style="list-style-type: none"> • Least reliable, least expensive 	
Parametric estimate	<ul style="list-style-type: none"> • Parametric estimating is usually a mathematical model based on historical information. • Repetitive work <ul style="list-style-type: none"> • Algorithm to calculate • Effort: billable time for the labor • Regression analysis <ul style="list-style-type: none"> • Variable that's most important • Learning curve <ul style="list-style-type: none"> • Worker are more skilled after repetitive 	
Three point estimate <ul style="list-style-type: none"> • Cost or schedule for work packages 	<ul style="list-style-type: none"> • Triangular distribution <ul style="list-style-type: none"> • Optimistic • Most likely • Pessimistic • Program evaluation and review technique (beta distribution) (PERT) <ul style="list-style-type: none"> • Weighted estimate for Triangular distribution 	
Bottom up estimate	<ul style="list-style-type: none"> • Start at bottom, takes the longest, more correct estimate • Estimate all work package in WBS • Benefit is team member see the cost for each task 	
Reserve time	<ul style="list-style-type: none"> • Contingent reserve - money related to risk- for known risk 	

		<ul style="list-style-type: none"> • “Contingency reserve” is associated with a known-unknown and is usually added to the project management plan. A management reserve is generally for an unknown-unknown and not added to the project management plan. • Management reserve - money or time reserved <ul style="list-style-type: none"> • Within budget, not part of the schedule baseline, but it's in the overall project duration • Risk has time associated • Over time, reserve can be reduced
	Constraints and Assumptions	Assumption <ul style="list-style-type: none"> • Force majeure - natural disaster
	Schedule Network Analysis	Float <ul style="list-style-type: none"> • Free float <ul style="list-style-type: none"> ◦ Delayed without impact to other activity • Total float <ul style="list-style-type: none"> ◦ Delay without impact to project completion • Project float <ul style="list-style-type: none"> ◦ Without passing customer expected date
	Project Simulation	<ul style="list-style-type: none"> • What if analysis <ul style="list-style-type: none"> • uses Monte Carlo simulation <ul style="list-style-type: none"> ◦ simulate the outcome of a project by making use of three- point estimates (optimistic, pessimistic, most likely) for each activity, a huge number of simulated scheduling possibilities, or a few selected scenarios that are most likely, and the network diagram. ◦ The outcome of this analysis may be used to evaluate the project schedule under adverse conditions and to develop the preventive and contingency action plan to reduce the impact and probability of the unexpected situations. •
	Duration Compression	<ul style="list-style-type: none"> • Crashing <ul style="list-style-type: none"> • Add more labor • Fast tracking <ul style="list-style-type: none"> • Phases overlap • Increase risk and overlaps • “Fast tracking” the schedule is a compression technique in which activities are generally done in parallel. This technique generally increases the risk on the project but may not increase costs. • Resource leveling <ul style="list-style-type: none"> • Level everyone's hour • Resource smoothing <ul style="list-style-type: none"> • Level labor except for critical path

	Control schedule	<ul style="list-style-type: none"> Agile schedule control <ul style="list-style-type: none"> Velocity is the rate deliverables are produced and accepted
	Measure performance	<ul style="list-style-type: none"> Earned Value management Burn down chart
	Relationship	<ul style="list-style-type: none"> Finish to start most common!!! Start to start <ul style="list-style-type: none"> One can't start until the other one starts, or start at the same time Finish to finish <ul style="list-style-type: none"> Can't finish until the first finishes. Start to finish <ul style="list-style-type: none"> successor activity cannot finish until a predecessor activity has started
Cost Management	Trends	<ul style="list-style-type: none"> Recurring cost Lift cycle costing - how much to maintain
	Estimate	<ul style="list-style-type: none"> Accuracy <ul style="list-style-type: none"> Rough order of magnitude estimate > budget estimate > definitive estimate A rough order of magnitude estimate has a range of -25% to +75%. A definitive estimate is generally within the range of -5% to +10%. Cost <ul style="list-style-type: none"> Direct Indirect <ul style="list-style-type: none"> Shared among projects Variable <ul style="list-style-type: none"> Varied fixed
	Cost baseline	<ul style="list-style-type: none"> s-curve
	EVM Earned Value Management	<ul style="list-style-type: none"> BAC (budget at completion)-original budget PV (Planned value) - \$ worth of work should be done CPI - spending = EV/AC $SPI=EV/PV$ $TCPI=(BAC-EV)/(BAC-AC)$ Benefit-cost ratio <ul style="list-style-type: none"> >1 good 1.7 means revenue is 1.7 times of cost net present value (NPV) <ul style="list-style-type: none"> The current value of future cash flows >0 worth doing Higher better

		<ul style="list-style-type: none"> • IRR <ul style="list-style-type: none"> • interest rate of return • Higher better
Quality Management	Big Quality Picture	<ul style="list-style-type: none"> • Measurable term • Requirements • Beware of gold plating • Management responsibility <ul style="list-style-type: none"> • Need to provide the tools • Deming's "plan do check act" <ul style="list-style-type: none"> • PDCA
	Adaptive	<ul style="list-style-type: none"> • Retro is with PM and member
	Planning	<ul style="list-style-type: none"> • PMI theme: plan, implement, measure, react, document • Have to meet scope to have quality • 5 key inputs for planning quality <ul style="list-style-type: none"> • Project charter • PM plan • Project document • EEF, OPA
	Trend Analysis	<ul style="list-style-type: none"> • Technical performance
	Cost of quality	<ul style="list-style-type: none"> • Cost of conformance <ul style="list-style-type: none"> • Prevention <ul style="list-style-type: none"> ◦ Phil Crosby popularized the concept of the cost of poor quality, advocated prevention over inspection and “zero defects,” and defined quality as conformance to specification (project produces what it was created to produce). • Appraisal Cost <ul style="list-style-type: none"> ◦ inspection, laboratory measurements and analysis, machinery maintenance and calibration, field testing, and procedure checking. • cost of non-conformance <ul style="list-style-type: none"> • reworking, scrapping, and the loss of business
	Create quality management plan	<ul style="list-style-type: none"> • Quality control is inspection-driven
	Manage quality	<ul style="list-style-type: none"> • happen before and during project • Everyone is responsible • Quality audit <ul style="list-style-type: none"> • Document best practice
	Design for x	<ul style="list-style-type: none"> • Build around x, lower cost and improve service etc.

		<ul style="list-style-type: none"> Designed for X is a technique that can be used to help design a product for a particular characteristic. In this example, it's designed for cost, in which case the product would be designed to be cost-effective. X is a variable that can stand for reliability, deployment, assembly, cost, or safety.
	<p>Control quality -inspection driven -quality is prevention driven</p>	<ul style="list-style-type: none"> Inspection --not customer -- throughout the project <ul style="list-style-type: none"> Root cause analysis ->quality control->validation by customer Check sheet = tally sheet <ul style="list-style-type: none"> Organize data about a quality issue Sampling <ul style="list-style-type: none"> Attribute sampling -yes/no Variable sampling - how far from quality acceptance Design of Experiments (DOE) <ul style="list-style-type: none"> statistical method usually applied to the product of a project. This method provides a "what-if" analysis of alternatives to identify which factors might improve quality. It provides statistical analysis for changing key product or process elements all at once to optimize the process.
	<p>Flow chart</p>	<ul style="list-style-type: none"> Control chart <ul style="list-style-type: none"> Use in repetitive activities Upper limit and lower limit Rule of seven <ul style="list-style-type: none"> Seven incidents on one side of the mean Not random Out of control <ul style="list-style-type: none"> Lower than lower spec  <ul style="list-style-type: none"> Histogram <ul style="list-style-type: none"> Bar chart Pareto diagram <ul style="list-style-type: none"> 20% good from 80% of the work



- Scatter diagram
 - Show correlation between 2
- Run chart
 - Similar to control chart
 - Across the calendar
- Ishikawa Diagram
 - Fishbone diagram
 - Causes of defects
- A flowchart is sometimes called a process diagram, which can display the sequence of steps a given process will follow.
- Mind mapping is a method used to visually organize and group information.

Resource management

Key concepts

- Organizational change

Trends

- Lean management
 - Backlog, as available
- Just in time (JIT)
 - Only have material needed
- Kaizen
 - Small change over time to big result
- Total quality management (TQM) is when everyone in the company is responsible for quality in the underlying process of how a product is made.
 - Continuous improvement
- Total productive maintenance (TPM)
 - Preventative maintenance
- Theory of constraints
 - Weakest chain or most restrictive
- Emotional intelligence

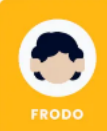


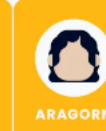

- Inbound
 - With myself
- Outbound
 - Understand other ppl
- Reduce turnover
- Self-organizing team
 - Generalized specialist
- Virtual team
 - Communication demand goes up
 - Experts from anywhere in the world
 - Gaps in sharing knowledge

Adaptive environment

- Team structure max focus and collaboration
- Physical and human resources is less predictable, this is more for knowledge driven work
- Need fast supply, not waiting for material or resources

Resource planning

- Matrix chart = responsibility assignment matrix =
- RACI chart (responsible, accountable, consulted, and informed)
 - Only one person can be accountable

	 FRODO	 SAM	 GANDALF	 ARAGORN	 ELROND
Decide on what to do with ring	C	I	A	C	R
Create Fellowship	R	C	A	C	R
Get the ring to Mount Doom	R	C	A	C	I
Distract and defeat enemies	I	R	C	R	I

- Organizational Breakdown Structure (OBS)
 - positions and relationships in a top-down, graphic format.

Relation to organizational theory

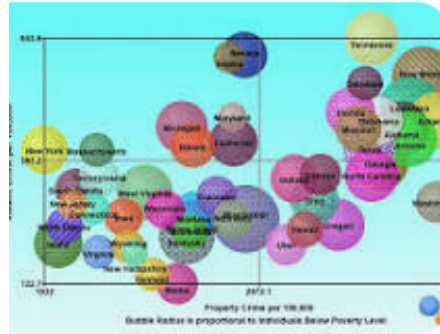
- Maslow's hierarchy of needs
 - Self-actualization
 - calling
 - Esteem needs
 - Pride in your work

		<ul style="list-style-type: none"> • Social • Safety • Physiological <ul style="list-style-type: none"> ◦ Water air food • Herzberg's theory of motivation <ul style="list-style-type: none"> • Demotivators (hygiene agents) <ul style="list-style-type: none"> ◦ Poor pay, policy, pressure • Motivators <ul style="list-style-type: none"> ◦ Recognition ◦ Varied work ◦ Sense of achievement • McGregor's x and y <ul style="list-style-type: none"> • X bad • Y good • McClelland's theory of needs <ul style="list-style-type: none"> • Individual's needs are acquired over time • Thematic apperception test <ul style="list-style-type: none"> ◦ Which need is driving the individual • Ouchi's theory z <ul style="list-style-type: none"> • Loyalty, Lifelong employment workers need to be involved with the management process. • Vroom's expectancy theory <ul style="list-style-type: none"> • How they behave differently in front of different ppl base on expectation • Halo Effect <ul style="list-style-type: none"> • Positive attribute of a person influence a decision
	Create a plan	<ul style="list-style-type: none"> • Team charter - created in the resource management plan <ul style="list-style-type: none"> • Can be updated by the team anytime, no change request needed • Team value • Communication guideline • Decision making process • Conflict resolution • Meeting • Team agreements
	Estimate activity resources	<ul style="list-style-type: none"> • Low of diminishing returns <ul style="list-style-type: none"> • Can't keep adding labor, will hit yield and pay more for the labor • Basis of estimate <ul style="list-style-type: none"> • Explain why a resource was assigned to an activity • Resource breakdown structure <ul style="list-style-type: none"> • hierarchical representation by category and type • Resource requirement

		<ul style="list-style-type: none"> • How many resources are needed for each activities
	Acquiring resource	<ul style="list-style-type: none"> • Acquisition resources <ul style="list-style-type: none"> • Work with vendor to get resources • Contractors might have resource leveling • Colocation - same location = tight matrix • Avoid zero sum rewards = employee of the month
	Naturally developing project teams	<ul style="list-style-type: none"> • Team move through a process • Bruce Tuckman Five phases <ul style="list-style-type: none"> • Forming <ul style="list-style-type: none"> ◦ PM directing the team on what should be done on the project. • Storming • Norming <ul style="list-style-type: none"> ◦ The Norming phase is when people socialize more often, develop trust, and create team norms. • Performing • Adjourning - leaving
	Assessment	<ul style="list-style-type: none"> • 360 approach <ul style="list-style-type: none"> • Everyone participate • anonymous
	Managing	<ul style="list-style-type: none"> • Style <ul style="list-style-type: none"> • Exceptional - reward and punishment • Power <ul style="list-style-type: none"> • Expert - experienced • Reward - power to reward • Formal - positional • Coercive - threatened • Referent - references
Communication plan	Key concept	<ul style="list-style-type: none"> • face to face is always preferred • Communication technology <ul style="list-style-type: none"> • tools, systems, and equipment that are used to transfer different information to the stakeholders of the project. • Include sensitivity and confidentiality
	Trends	<ul style="list-style-type: none"> • Include stakeholders in reviews, meetings • Social computing • Active listening <ul style="list-style-type: none"> • Summarize back • Nonverbal >55%

	Methods	<ul style="list-style-type: none"> • Interactive - real time • Push - email letter • Pull - get info from places
	Successful communication	<ul style="list-style-type: none"> • Para lingual <ul style="list-style-type: none"> • Pitch tone and inflections
	Process	<ul style="list-style-type: none"> • Plan communication <ul style="list-style-type: none"> • create the communication management plan • Manage communication <ul style="list-style-type: none"> • Execute • update the stakeholders on the project's progress.
Risk	Key concept	<ul style="list-style-type: none"> • Risk is not always bad • Pure risk <ul style="list-style-type: none"> • Health risk • Always bad • Risk appetite <ul style="list-style-type: none"> • Want to take on risk • Risk tolerance • Risk threshold • Utility function <ul style="list-style-type: none"> • Willingness to tolerate risk • Risk Level: <ul style="list-style-type: none"> • Individual project risk • Overall project risk
	Trends	<ul style="list-style-type: none"> • Risk exposure <ul style="list-style-type: none"> • Threat vs opportunity • Non event based risk <ul style="list-style-type: none"> • Variability risk <ul style="list-style-type: none"> ◦ Weather ◦ Error and defects • Ambiguity risk <ul style="list-style-type: none"> ◦ Uncertain future such as future regulations or changes in technology. • Emergent risk - unknowable-unknowns. <ul style="list-style-type: none"> • Require project resilience • Project resilience <ul style="list-style-type: none"> • Awareness of unknowable
	Agile	<ul style="list-style-type: none"> • Incur more uncertainty and risk • During iteration, team respond to risk

	Risk management plan	<ul style="list-style-type: none"> • Risk efficiency <ul style="list-style-type: none"> • Quick response
	Stakeholder tolerance	<ul style="list-style-type: none"> • Defined at the launch of the project in written format
	Risk management policy	<ul style="list-style-type: none"> • Risk policy <ul style="list-style-type: none"> • Including identify risk
	Risk management plan	<ul style="list-style-type: none"> •
	Risk categories	<ul style="list-style-type: none"> • Risk breakdown structure <ul style="list-style-type: none"> • Categorized and ranked • Risk Register <ul style="list-style-type: none"> • Analysis and action plan • Risk Report <ul style="list-style-type: none"> • Create with or after risk register • Source of risks and summary of risks
	Identify risk	<ul style="list-style-type: none"> • Assumption <ul style="list-style-type: none"> • True or false and how that impacts the system • Stability <ul style="list-style-type: none"> ◦ How reliable is the information • Delphi technique <ul style="list-style-type: none"> • Poll a group of experts
	Risk analysis	<ul style="list-style-type: none"> • Cardinal or ordinal scale for seriousness <ul style="list-style-type: none"> • Ordinal -->high, medium, low, • Cardinal -->expressed as values from 0.0 to 1.0 and can be stated in equal (linear) or unequal (nonlinear) • qualitative risk analysis <ul style="list-style-type: none"> • Use to look at the probability or the impact and rank • Not all risk need qualitative risk analysis <ul style="list-style-type: none"> ◦ Very likely or little possibility • Bubble chart <ul style="list-style-type: none"> • bigger bubble, more impact • Three dimension



- Risk data quality assessment
 - Risk data quality assessment evaluates the degree to which the data about the individual risks are accurate and reliable

Sensitivity analysis

- Tornado diagram
 - compare and prioritize the relative impact of different risks

Expected monetary value

- Probability impact matrix

Project simulation

- Monte Carlo analysis
 - S curve

Risk responses

- Escalate
 - To management
- Avoidance
 - go down a different path all together. The risk is eliminated and cannot happen.
 - For example: choose another contractor, they cannot get delayed by that particular contractor.
- Transference
 - Hire someone else
- Mitigation
 - Reduce probability
- Acceptance
 - Low level so accept
- Positive risk - can lead to shorten the schedule, smaller budget and increasing customer satisfaction
 - Escalate
 - To management
 - Exploiting
 - Take advantage
 - Sharing
 - Partner up with other group
 - Enhancing

		<ul style="list-style-type: none"> ◦ Increase the chance <ul style="list-style-type: none"> • Accepting • Fall back plan is needed • Residual risk <ul style="list-style-type: none"> • Remaining risk • Secondary risk <ul style="list-style-type: none"> • One thing happened and second risk
	Justifying risk reduction	<ul style="list-style-type: none"> • Exam cost to eliminate risk
	Implement risk responses	<ul style="list-style-type: none"> • risk owner empowered to do risk responses • Risk response--check effectiveness
Procurement management	Key concept	<ul style="list-style-type: none"> • MOA memoranda of agreements • SLA Service level agreement • Seller participation <ul style="list-style-type: none"> • Buyer is key stakeholder • If the contract requires certain things before commencement and the seller does not issue, you can issue a default letter (notice of default)
	trends	<ul style="list-style-type: none"> • Trial engagement • tailoring
	Planning	<ul style="list-style-type: none"> • SOW: <ul style="list-style-type: none"> • Scope of work • specifications, desired quality, and quality levels • Include: business need, scope, strategic plan • Term of reference (TOR) <ul style="list-style-type: none"> • What task contractor is required to complete • Standard, artifacts, things provided by buyer, schedule • SOW and TOR does not define the product as a whole • Market condition <ul style="list-style-type: none"> • Sole <ul style="list-style-type: none"> ◦ Only one seller • Single <ul style="list-style-type: none"> ◦ Prefer one • Oligopoly <ul style="list-style-type: none"> ◦ One player affect the rest • preapproved seller lists <ul style="list-style-type: none"> • a list of sellers that have been properly vetted by the organization and can be used as potential sellers on a project
	contracts	<ul style="list-style-type: none"> • Firm fixed price contacts

		<ul style="list-style-type: none"> • Seller higher risk • Fixed price incentive fee <ul style="list-style-type: none"> • Incentive for something • Graduated Fixed Price hourly rates for the supplier differ based on delivery timing • Cost reimbursable <ul style="list-style-type: none"> • SOW can't be defined early • Buyer carry risk • Cost plus fixed fee <ul style="list-style-type: none"> • Allowable cost • Cost plus incentive fee <ul style="list-style-type: none"> • Bonus get early and allowable cost • Cost plus award <ul style="list-style-type: none"> • Award mystery decided by buyer • Time and material <ul style="list-style-type: none"> • Not to exceed clause • Might have time limit
	Create procurement plan	<ul style="list-style-type: none"> • Should cost estimate • Documents <ul style="list-style-type: none"> • Bid/quote: price • Proposal • Invitation to bid • Seller selection <ul style="list-style-type: none"> • Weighting system • Screening system
	Selecting seller	<ul style="list-style-type: none"> • Letter of intent • Function specifications and performance specifications are the responsibility of the seller, whereas design specifications are usually provided by the buyer; also, risks associated with design are the responsibility of the buyer.
	Process Group	<ul style="list-style-type: none"> • Plan procurement <ul style="list-style-type: none"> • Run Make or Buy analysis/decision • Create templates for procurement statement • Choose a contract type for every procurement • Formulate the procurement documents • Determine the source selection criteria • Identify risks and create appropriate risk response plans for risk mitigation • procurement strategy <ul style="list-style-type: none"> • how the procured section of the project should be delivered

		<ul style="list-style-type: none"> • will also outline the contract types and procurement phases. • Conduct procurement <ul style="list-style-type: none"> • acquiring seller responses • analyzing their bids • choosing a seller • awarding a contract. • Control procurement (monitoring and controlling) <ul style="list-style-type: none"> • managing procurement relations • monitoring agreement performance • make changes when required • Make payments
Stakeholders		<ul style="list-style-type: none"> • Anyone can influence over project are stakeholders • Classify by <ul style="list-style-type: none"> • Interest/influence/involvement • Stakeholder identification <ul style="list-style-type: none"> • Identify-interest, influence, contributions, expectation • Prioritize-power, influence, impact • Anticipate and plan • Salience model (power interest grid) <ul style="list-style-type: none"> • Power, urgency, legitimacy • Stakeholder analysis-- influence <ul style="list-style-type: none"> • Upwards- stakeholders above you such as senior management. • Downwards- those below you such as team members • Outwards • Sideways • Prioritization • When to update plan <ul style="list-style-type: none"> • Start of a new phase • Engagement level <ul style="list-style-type: none"> • Unaware • Resistant • Neutral • Supportive • Leading • Plan Stakeholder engagement vs communication plan <ul style="list-style-type: none"> • Plan Stakeholder engagement: who are the stakeholder, what's their interest, how to engage--determine approach • Manage Stakeholder engagement: communicate with stakeholder to meet their needs • Communication plan: create a plan to ensure that all stakeholders are receiving the correct communications.

		<ul style="list-style-type: none"> • stakeholder engagement assessment matrix <ul style="list-style-type: none"> • current vs desired engagement levels of stakeholders
Ethics		<ul style="list-style-type: none"> • Privity - confidentiality between customer and manager <ul style="list-style-type: none"> • The legal contractual relationship that exists between a buyer and a seller after the contract is signed that the vendor is referring to is known as: privity • Privity is the contractual relationship that both buyer and seller have to realize and maintain. • Code of conduct <ul style="list-style-type: none"> • Sapir-Whorf hypotheses <ul style="list-style-type: none"> ◦ If I understand the language, I have better understanding of the culture and work • Culture shock • Ethnocentrism <ul style="list-style-type: none"> ◦ Measure other culture by your own
Agile		<ul style="list-style-type: none"> • Emergent leadership <ul style="list-style-type: none"> • Anyone can be leader • Four value statement <ul style="list-style-type: none"> • Individual and interactions over processes and tools • Customer collaboration over contract negotiation • Agile manifesto--Keys of great agile projects <ul style="list-style-type: none"> • Daily • Trust, environment support • Face to face conversation • Working software • Maintain a constant pace • Simplicity--max work not done • Self-organizing team • Scrum basics <ul style="list-style-type: none"> • Three pillars <ul style="list-style-type: none"> ◦ Transparency <ul style="list-style-type: none"> • Require common standard • Agree to definition of done ◦ Inspection <ul style="list-style-type: none"> • Not get into the work but skilled inspector during the work ◦ Adaptation <ul style="list-style-type: none"> • Adjustment are made ASAP • Agile Unified Process Principle <ul style="list-style-type: none"> • Model. Understand the business of the organization, the problem domain being addressed by the project, and identify a viable solution to address the problem domain.

		<ul style="list-style-type: none"> • Implementation. Transform model(s) into executable code and perform a basic level of testing, in particular unit testing. • Test. Perform an objective evaluation to ensure quality. This includes finding defects, verifying that the system works as designed, and validating that the requirements are met. • Deployment. Plan for the delivery of the system and to execute the plan to make the system available to end users. • Configuration Management. Manage access to project artifacts. This includes not only tracking artifact versions over time but also controlling and managing changes to them. • Project Management. Direct the activities that take place within the project. This includes managing risks, directing people (assigning tasks, tracking progress, etc.), and coordinating with people and systems outside the scope of the project to be sure that it is delivered on time and within budget. • Environment. Support the rest of the effort by ensuring that the proper process, guidance (standards and guidelines), and tools (hardware, software, etc.) are available for the team as needed.
Scrum		<ul style="list-style-type: none"> • Life cycle <ul style="list-style-type: none"> • Iterative <ul style="list-style-type: none"> ◦ Single delivery, correctness of solution, big consequences • Incremental (store) <ul style="list-style-type: none"> ◦ Speed, usually has test environment ◦ Requirement is frozen once developed ◦ Pro: <ul style="list-style-type: none"> • Regression testing needed for each iteration ◦ Con: <ul style="list-style-type: none"> • Cost may exceed value first • Later functionality may reveal problem • Sprint <ul style="list-style-type: none"> • Increment is like the product developed so far • Product backlog vs sprint backlog (does not change after sprint started) • Product owner in charge of create user stories that are easy to understand • Daily scrum <ul style="list-style-type: none"> • Burndown chart can be used to track remaining work <ul style="list-style-type: none"> ◦ X axis for number of sprints • Considerations <ul style="list-style-type: none"> • Long sprint --risk disconnect with stakeholders. Market condition, team composition might change
Agile roles and responsibilities		<ul style="list-style-type: none"> • Team forming • Agile team <ul style="list-style-type: none"> • 3-9 ppl

		<ul style="list-style-type: none"> • 33 feet from each other • Osmotic communication <ul style="list-style-type: none"> ◦ Co-located ◦ Useful information flows between members • Distributed team <ul style="list-style-type: none"> ◦ Cost efficient • Product Owner <ul style="list-style-type: none"> • Forecast completion date • Only PO can cancel a sprint • in charge of create user stories that are easy to understand • If PO refuse to prioritize and feel all work are valuable, PM need to train them on benefits • Scrum master <ul style="list-style-type: none"> • Impediments <ul style="list-style-type: none"> ◦ Alert management ◦ Prioritize the impediments list and address • Can inform PO's functional manager • Address problem during retro
Agile requirement		<ul style="list-style-type: none"> • User story <ul style="list-style-type: none"> • 1-3 days of work or 20 hours of work • should contain the user type, want/need, and the value. <ul style="list-style-type: none"> ◦ “As a [persona], I want to [software goal], so that [result].” • Three Cs - components of user stories <ul style="list-style-type: none"> • Card - so it's concise; can be used to note priority/cost • Conversation - story estimation or discuss requirement during release/sprint planning • Confirmation - acceptance test • Characteristics <ul style="list-style-type: none"> • Independent - can be prioritized in any order • Negotiable - on cost and function • Valuable • Estimate • Small - 4-40 hour • Testable • Workshop <ul style="list-style-type: none"> • Gather requirement • Can be retro, planning, or estimating session • a diverse group of people, facilitate for involvement, and get people involved early. • HIPPO (HIGHEST-Paid Person's Opinion) decision making is when people agree with the highest paid person. • Agile model <ul style="list-style-type: none"> • Light documentation

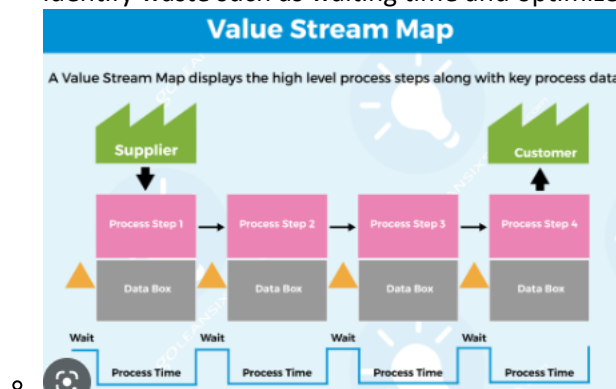
- Difficult with large team
 - There are four themes to manage when setting up large agile projects: people, product, project, and process
- Case diagram
 - System rectangle
 - User oval
- Data model
 - Wireframe
 - Diagram showing solution
 - User personas
 - Bio sketch for key stakeholder
- Contract
 - Form of constraint
 - Collaboration over contract
 - Dynamic system development method
 - Fixed schedule cost and quality
- Fixed price contract
 - Both party share risk
 - Early then will get higher hourly rate
 - Late then lower hourly rate
 - Individual work package are estimated for cost
- Gulf of evaluation
 - Different understanding for DoD
 - what one person described is often different from how another interpreted it.
- Value based analysis
 - Business benefit-cost, how often generate business value
 - Value based decomposition
 - Product box, most value you have
 - Coarse grained requirement
 - Delay decision on implementation details until last responsible moment
- Behavior Driven Development (BDD)
 - Given (a particular context or requirement)
 - When (an action takes place)
 - Then (there is a result)
-

Estimating use stories and iterations

- Agile predicting is not as precise (time and cost)
- Ideal time: not interruption
 - time it takes to complete a given task assuming zero interruptions or unplanned problems.
- Wideband Delphi

		<ul style="list-style-type: none"> • Rounds of anonymous estimate • Iteration hardening <ul style="list-style-type: none"> • Final testing • Architectural spikes <ul style="list-style-type: none"> • Proof of concept • An architectural spike is a series of investigations centered around finding solutions to one or more problems. • Shorter than a sprint • Risk based spike <ul style="list-style-type: none"> • Whether a new method, process or tool will reduce eliminate risks • Estimate story size <ul style="list-style-type: none"> • Fibonacci sequence <ul style="list-style-type: none"> ◦ 1,2,3,5,8,13,21 • Velocity -- how much work can team do in an increment--adjust based on retro • Affinity estimating <ul style="list-style-type: none"> ◦ Use historical date • Planning poker <ul style="list-style-type: none"> ◦ Everyone has cards represent story points, secretly show cards to SM for each story, discuss if different points • Fist of five <ul style="list-style-type: none"> • 3 or less finger need to say reason • Highsmith Decision Spectrum <ul style="list-style-type: none"> • Allow ppl to indicate support and share concern • MOSCOW <ul style="list-style-type: none"> • Must have, should have, could have, will not have • Story too big then will need "slicing"
Agile performance review		<ul style="list-style-type: none"> • PO is in charge of the overall progress, development team track sprint progress • All stakeholders have access to this info
Different agile approach		<ul style="list-style-type: none"> • Kanban <ul style="list-style-type: none"> • When there's too much work in progress, and bottle neck, then will need to implement • Limit WIP • Work collaborate • XP <ul style="list-style-type: none"> • Iteration (sprint is for scrum) • Character: <ul style="list-style-type: none"> ◦ Simplicity <ul style="list-style-type: none"> • Drawing diagram ◦ Courage <ul style="list-style-type: none"> • Discarding or refactoring

- Humility
 - We don't know everything
- Value: communication, simplicity, feedback, courage and humility.
- Metaphor
 - Explain designs and create a shared vision between customers and the development team.
 - Like "shopping cart" in shopping website
- Pair programming
- roles
 - Coach-SM
 - Customer
 - Programmer
 - Tester
- Refactoring
 - Clean up codes
 - Lower coupling, increasing cohesion
- Lean
 - Fast and lean
 - Defer decision
 - Seven waste
 - Partially done work
 - Extra processes
 - Extra feature
 - Task switching
 - Waiting
 - Motion- time waste on find thing
 - Defects
 - Value Stream Mapping
 - Visual representation of the flow of info through a process f
 - Identify waste such as waiting time and optimize the process




- Crystal
 - assumptions.
 - That the team can make itself more efficient by streamlining their work and the project,
 - That every project is different from others and requires some specific methods and strategies.
- feature-driven development
 - domain object modeling, developing by feature, individual class code ownership, feature teams, inspections, configuration management, regular builds, and visibility of progress and results.

Agile products and projects

- Release planning
 - Specific product functionality going to which release
- Feature with Risk
 - Should be addressed early in project iteration
- Prioritization
 - Customer decide whether successful or not
 - Discuss priority at sprint review
- Kano analysis
 - X axle : absent fulfilled feature
 - Y axle: satisfaction, dissatisfaction



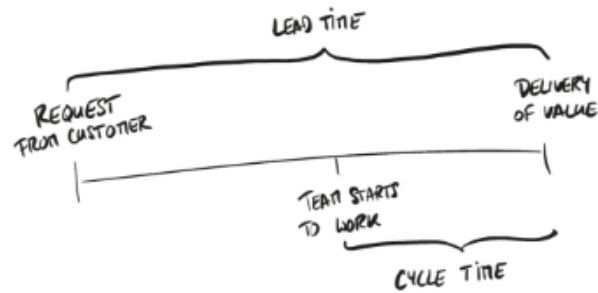
-  Prodify
- Dot voting for prioritization
 - Need to avoid too many options
 - Similar options are penalized
 - People might follow crowd
- Monopoly money
 - Business value oriented
- Penalty mean what's the cost for not doing this
- Little's law

		<ul style="list-style-type: none"> • Duration of a queue is proportional to its size • Limit WIP make ppl work faster
Testing and verifying		<ul style="list-style-type: none"> • Acceptance testing <ul style="list-style-type: none"> • Specific requirement • Exploratory testing <ul style="list-style-type: none"> • Play with it • Usability testing • Continuous integration <ul style="list-style-type: none"> • Cons: long set up time, cost of dedicated server, time to build automatic tests • Setting environment is part of product backlog • Test driven development <ul style="list-style-type: none"> • How you write the test: N unit J unit • Pass the test--> Refactoring • Developer don't write their own test • Partial adoption is actually a common team pitfall when it comes to test-driven development. • Acceptance test-driven development (ATDD) helps with communication between the business customers, the developers, and the testers. <ul style="list-style-type: none"> ◦ The tests are authored by the triad of customer, tester, and developer. ◦ Discuss requirements > distill test framework > develop code and run test > demo
Stakeholder engagement		<ul style="list-style-type: none"> • Stakeholder are invited to planning and sprint review <ul style="list-style-type: none"> • Retro is for the team • Project tweet <ul style="list-style-type: none"> • Describe the goal of the project in 140 characters • Agile project charter <ul style="list-style-type: none"> • Broad and high level • Content: <ul style="list-style-type: none"> ◦ Vision statement ◦ Team rules ◦ Code of conduct ◦ Communication ◦ DoD • Communication <ul style="list-style-type: none"> • Dispatching model - broadcast • Collaborative model • Collaboration over negotiation <ul style="list-style-type: none"> • Collaboration <ul style="list-style-type: none"> ◦ Accept - do nothing ◦ Avoid - create a work around

- Ameliorate - reduce impact
- Cover - make it invisible
- Resolve -
- Conflict resolution
 - Withdraw/avoid - leave the convo, discuss later
 - Smooth/accommodate - downplay difference
 - Compromise/reconcile - lose lose
 - Force/direct - person with power makes the decision
 - Collaborate/problem solve
- Conflict resolution levels
 - Problem to solve - open in fact based
 - Disagreement - guarded and closed
 - Contest - personal attacks
 - crusade - ideological
 - World war - little or non-existent
- Convergent - convert decisions for collective agreement
- Agile team
 - <12 ppl
- Dreyfus Model
 - Novice - follow rules
 - Advance beginner - understand rules
 - Competent - rules are best for each situation
 - Proficient - best strategy
 - Expert decision - intuitive decision making
- Shu-ha-ri of skill mastery
 - Shu-follow rules
 - Ha-work intuitively, move away from the rules
 - Ri-make rules
- Team self-assessment

Risk and Issue

- Lead time
 - How long till done
- Cycle time
 - How long per process



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- Project cycle time
 - Work team can get done in a time
 - Productivity
- Defect cycle time
 - Discovered to fixed
- Defect rate
 - Frequency of defects found
 - Increase in escape defects means problem with process
- Variance analysis
 - Predictive project: Cost and schedule
 - Agile: performance variance
- Trend analysis
 - Lagging metrics: compare with past
 - Leading metrics: predict the future
- Kaizen
 - Continuous Change for the better
 - Small change lead to big improvement
- Project pre-mortem
 - Find failure point before they happen
- Retrospective
 - Triple nickel
 - 5mins on 5 ideas 5 times
 - Smart goal
 - Specific, measurable, attainable relevant, timely
- Swarming
 - team, or several team members, focus collectively on resolving a blocker
- The agile improvement process is plan, develop, evaluate, and learn.