Start at Inception

- Establish the project's software <u>scope and acceptance criteria</u> (requirements)
- Establish the <u>main use-case scenarios</u> that define the <u>core</u> functionality of the project.
- Evaluate alternative <u>architectures</u>; create the beginnings of your preferred candidate architecture.
- Estimate the overall <u>cost and schedule</u> for the project.
- Estimate <u>risks</u>
- Produce the "<u>business case</u>" – the business justification and benefit from having the functionality provided.
- Create a <u>work plan</u> for the following elaboration phase

Inception activities

- Formulate the scope of the project: <u>capture the context</u> and the most important <u>requirements and constraints</u>
- Plan and prepare a <u>business case</u>
- Evaluate <u>alternatives</u>:
  - risk management, staffing, project plan, and trade-offs among cost, schedule, and profitability
- Synthesize a <u>candidate architecture</u>

Inception outcomes

- A <u>vision document</u>
  - the core project's requirements, key features, main constraints
- List all use cases and actors already identified
- An initial project glossary (<u>features</u>)
- An initial <u>business case</u>, which includes the following
  - Business context
  - Success criteria (revenue projection, market recognition, and so on)
  - Financial forecast
- An initial risk assessment
- An <u>initial project plan</u>, which shows the phases and iterations

(example later)

Vision document

- What problem are we trying to solve? (Problem Statement)
  - describe the problem, who it affects, how it affects them, and what type of solution would ease the pain (solution can …..)
- Who are the stakeholders
  - persons or organizations. They may be affected by it either directly or indirectly
- Who are the users
- What are their respective needs
- What are the product features
- What are the functional requirements (Use Cases)
- What are the non-functional requirements
- What are the design constraints?

Identify features

- Example:
  - Record statistics
    - Time, Software defects and Source code size
  - Reporting
    - Personal reports and Team reports
  - Viewing
  - Statistics

Sketch high level use cases

- Software Engineer :
  - Create project, Enter data, Count items
  - Use on line help when needed, Create report
- Process administrator:
  - Configure system, Configure project
  - Install tools

Initial Project Plan

- "Iteration plan" for rest of inception phase
  - Artefact, who responsible, when due
- Example:
  - Plan done by 10th Oct
  - Environment set up ...
  - Vision complete by ...
  - Supplementary requirements
  - Initial use cases by ..
  - Risk list
  - Test plan
  - Finish "Inception Iteration"

Inception evaluation

- At the end of the inception phase is the first major project milestone. The evaluation <u>criteria</u> for the inception phase are:
  - <u>Stakeholder concurrence</u> on scope definition and cost and schedule estimates
  - <u>Requirements understanding</u> evident through use cases
  - Credibility of cost & schedule <u>estimates</u>, priorities, risks and development process
  - Depth and breadth of <u>prototype architecture</u>
  - Actual vs planned <u>expenditure</u>

Elaboration

- Requirements (resources) continue to be refined and additional use cases will be identified.
- Elaboration objectives:
  - Define, validate, and baseline the system architecture
  - Baseline the vision
  - Baseline a plan for the construction phase
  - Demonstrate that the baseline architecture will support this vision for a reasonable cost in a reasonable time

Elaboration activities

- The <u>vision</u> is elaborated and fully articulated.
- Develop solid understanding the vision of critical use cases.
- The process, the infrastructure, and the development environment are elaborated.
- Put in place development environment, tools, test automation systems, etc.
- Elaborate the system architecture:
  - Select subsystems that can be purchased
  - Integrate and assess selected components against primary use cases

Elaboration outcomes

- A <u>use-case model</u> (at least 80% complete) in which all use cases have been identified in the use-case model survey, all actors have been identified
  - Most use-case descriptions have been developed
- Supplementary requirements that capture the <u>non-functional requirements</u>
- A <u>software architecture description</u>
- An executable <u>architectural prototype (database design)</u>
- A revised <u>risk list</u> and a revised <u>business case</u>
- A <u>development plan</u> for the overall project
  - major and minor iterations and related deliverables
- A preliminary <u>user manual</u> (optional)

Elaboration evaluation

- Is the product vision stable?
- Is the architecture stable?
- Does the executable demo show that major risk elements have been addressed and resolved?
- Is the construction plan sufficiently detailed?
- Do all stakeholders agree that the current vision can be achieved with the current development plans?

Construction

- Develop remaining components and application features
  - coding, testing, and delivering iterated versions
  - cannot escape project creep
- Integrate all parts into the product
- Test all features thoroughly
- Achieve useful versions (alpha, beta, and other test releases) as rapidly as practical

Construction objectives

- <u>Achieving useful versions</u> as quickly as possible, or system <u>requirement</u>
- Minimized development <u>costs</u> by optimizing resource usage
  - avoiding unnecessary changes, scrap and rework
- Achieving adequate <u>quality</u> as rapidly as is practical

Construction activities

- Complete <u>development and testing</u> against the defined evaluation criteria

- Resource <u>management</u>, resource <u>control</u>, and process <u>optimization</u>

- <u>Assessment</u> of product releases against <u>acceptance criteria</u> for the vision

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Construction outcome

- A product ready to put in the hands of its end users. It should consists of the following:
  - The software product integrated on the adequate platforms
  - The user manuals
  - A description of the current release

Construction evaluation

- Decide whether the software, the sites and the users are ready to become operational without exposing to high risks
  - Is the product <u>stable and ready</u> to be exposed to the user environment?
  - Are the <u>stakeholders ready</u> for the product transition into the user environment?
  - Are the actual <u>resource expenditures</u> still acceptable relative to the projected expenditures?

Iterations

- Plan (started during Inception and refined in Elaboration) will have defined a series of iterations
  - Each Iteration
    - List of use-cases that it incorporates
    - Time schedule (time boxing)
    - Leads to a "build" that can be release to others

Iteration releases – a chance to replan

- With each iteration release, you revise your plan
  - Maybe you are lagging
    - need to reduce the scope
    - move some features from next phase to later phase
  - Maybe you have negative feedback from the users/customers
    - Re-analysis, re-design, re-work

Transition

- Move the software product to the users
- Phase starts when system is <u>mature enough</u> to be deployed in the end-user domain
  - <u>Usable subset</u> of the system has been completed to an acceptable level of quality
  - <u>User documentation</u> is available
- Phase includes:
  - <u>Beta testing</u> to validate the new system against users' expectations
  - Parallel operation with any <u>existing system</u> that the project is replacing
  - <u>Training</u> of users and maintainers
  - Rollout of the product to the <u>marketing, distribution, and sales team</u>

Transition objectives

- Achieve user <u>self-supportability</u>
- Achieve stakeholder concurrence that deployment baselines are complete and consistent with the <u>evaluation criteria</u> of the vision
- Achieve <u>final produce baseline</u> as rapidly and <u>cost</u> effectively as practical

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Transition activities

- <u>Deployment-specific engineering</u>, i.e., commercial packaging and production, sales rollout and etc.
- Tuning activities, including <u>bug fixing</u> and enhancement for <u>performance and usability</u>
- <u>Assessing the deployment baselines</u> against the vision and the acceptance criteria for the product

Transition evaluation

- You decide whether the objectives were met and whether you should start another development cycle. The primary evaluation criteria are:
  - Is the user satisfied?
  - Are the actual resources expenditures versus planned expenditures still acceptable?