Software Engineering

Outline

- Software process
- A process step
- Characteristics of a good process

For success in large software development, it is important to follow an engineering of a well-defined process.

Software Process

- Process consists of activities/steps to be carried out in a particular order.
- Software process deals with both technical and management issues.
- Consist of different types of process
- Process for software development:

  produces software as end-result

  – Multiple such processes may exist.

  – A project follows a particular process.

Process Types …

- Process for managing the project.
  - defines project planning and control
  - effort estimations made and schedule prepared.
  - resources are provided.
  - feedback taken for quality assurance.
  - monitoring done.

Process Types …

- Process for change and configuration mgmt.
  - Resolving requests for change.
  - Defining versions, their compositions
  - Release control
- Process for managing the above processes themselves
  - Improving the processes based on new techniques, tools etc.
  - Standardization and certifications (ISO, CMM)

Multiple processes

- A large software development company may have multiple development processes.
  A. For client-server based conventional/ conservative applications. (sales processing, payroll)
  B. For enterprise-level (ERP) projects based on packages available in the market and customization.
  C. For web-based e-commerce type.
  D. For data-warehousing decision support type.not for online-transaction but based on MIS, decision support system etc.
- The company may have many projects in each category.

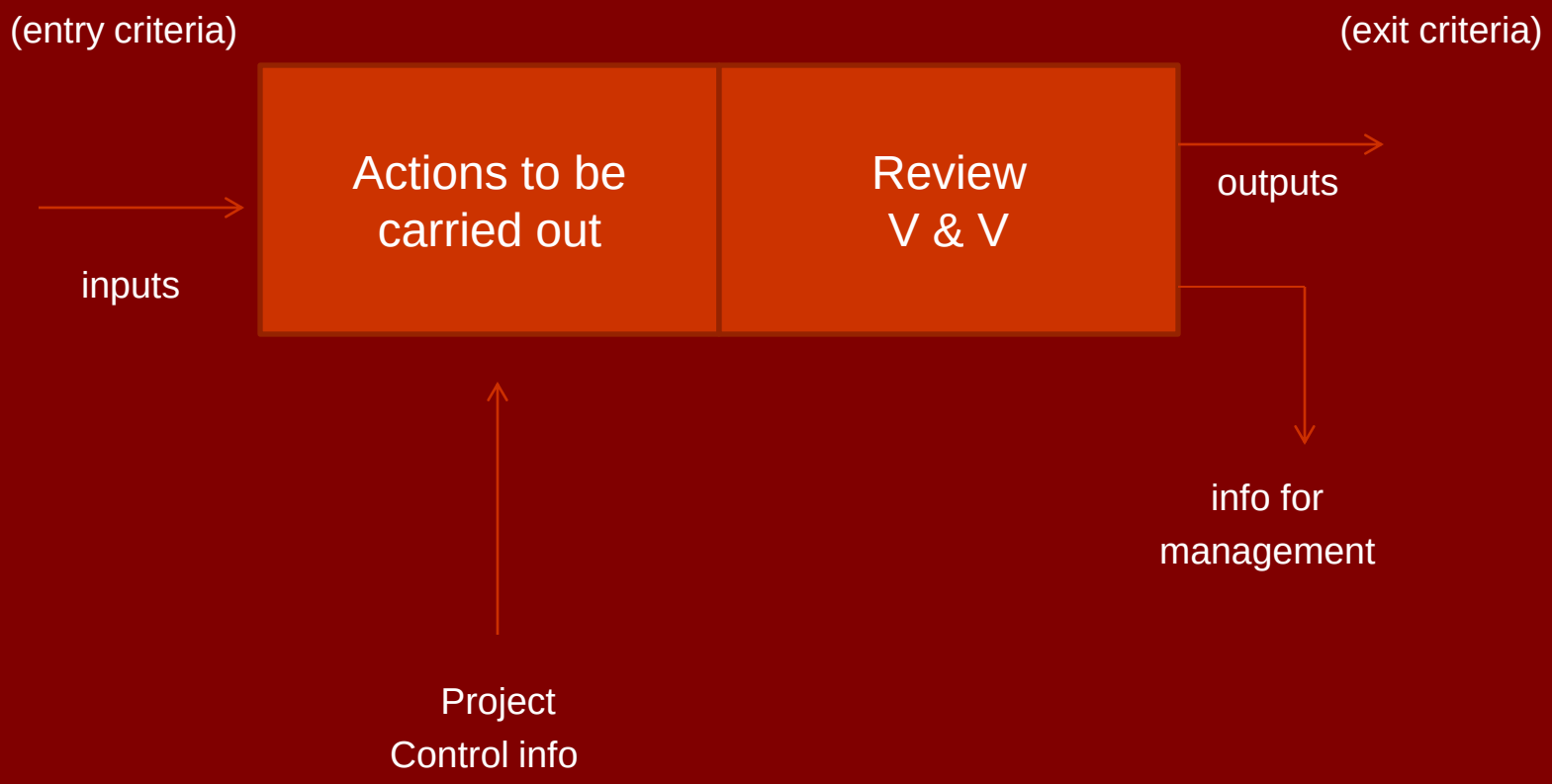
Step in Process

- Each step has a well-defined objective.
- Requires people with specific skills.
- Takes specific inputs and produces well-defined outputs.
- Steps defines when it may begin(entry criteria) and when it ends(exit criteria)
- Uses specific techniques, tools, guidelines, convention/conference. Certain commitments to fulfill.

Process step…

- Step must be executed as per project plan that gives duration, effort, resources, constraints, etc.
- It must produce information for management so that corrective actions can be taken
  - Eg. – adding more resources.
- A step ends in a review (V&V)
  - Verification: check consistency of outputs with inputs(of the step)
  - Validation: check consistency with user needs.

Process step



Characteristics of a Good Process

- Should be precisely defined – no ambiguity about what is to be done, when, how, etc.
- It must be predictable – can be repeated in other projects with confidence about its outcome.
  - Predictable with respect to effort, cost:

    Project A: Web-based library applications done by 3 persons in 4 months

    => Another project B (guest house bookings), similar in complexity should also take about 12 person months.

A Good Process …

- Predictable for quality : with respect to number and type of defects, performance, …

- Predictable process is said to be ‘under statistical control’ , where actual values are close to expected values
- It supports testing and maintainability
  - Maintenance by third party
  - Follow standards, provide necessary documentation.
  - This characteristic differentiates between prototype & product.

A Good Process . . .

- Facilitates early detection of and removal of defects
  - Defects add to project cost.
  - Late detection/correction is costly.
- It should facilitate monitoring and improvement
  - Based on feedback
  - Permit use of new tools, technologies
  - Permits measurement.

Assignment

- What is a process & what are its characteristics.