# CMMI for Development Model

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Process</th>
<th>Project</th>
<th>Engineering</th>
<th>Support</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>• Organizational Performance Management</td>
<td></td>
<td></td>
<td>• Causal Analysis and Resolution</td>
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<tr>
<td>4</td>
<td>• Organizational Process Performance</td>
<td>• Quantitative Project Management</td>
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<tr>
<td>3</td>
<td>• Organizational Process Definition</td>
<td>• Integrated Project Management • Risk Management</td>
<td>• Requirements Development • Technical Solution • Product Integration • Verification • Validation</td>
<td>• Decision Analysis and Resolution</td>
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<td>• Organizational Process Focus</td>
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<td>• Organizational Training</td>
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<td>2</td>
<td>• Requirements Management</td>
<td></td>
<td>• Configuration Management</td>
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<td></td>
<td>• Project Planning</td>
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<td>• Measurement and Analysis</td>
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<td></td>
<td>• Project Monitoring and Control</td>
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<td>• Process and Product Quality Assurance</td>
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<td>• Supplier Agreement Management</td>
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Iron Triangle

Plan Driven

Features

Resources

Time

Fixed

Resources

Time

Estimated

Features

Value Driven

Plan or Value Driven?

• Depends on
  – Type of software being developed
  – Capabilities of the team
  – Culture of the company

• May use a mix
Software process movements

- Predictive – 1970
  - Waterfall
- Iterative – 1980s, 1990s
  - Spiral, RAD, RUP
- Adaptive (Agile) – late 1990s
  - XP, Scrum, Crystal, FDD, Lean, DSDM, Kanban, …
- Enterprise Adaptive (Lean & Agile) – late 2000s
  - SAFe, Nexus, …

Waterfall – plan driven
Scrum – value driven

Scrum Definition

- Scrum (n): A framework within which people can address complex adaptive problems, while productively and creatively delivering products of the highest possible value.
Scrum Team

- Product Owner
  - ?
- Development Team
  - ?
- Scrum Master
  - ?

Scrum Events

- The Sprint
- Sprint Planning
- Daily Scrum
- Sprint Review
- Sprint Retrospective
Scrum Artifacts

- Product Backlog
- Sprint Backlog
- Increment

Scrum Definition of Done

- A shared understanding of what it means for work to be complete.
CMMI Goals – Project & Support

<table>
<thead>
<tr>
<th>Requirements Management</th>
<th>• Requirements are managed and inconsistencies with plans and work products are identified.</th>
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</thead>
<tbody>
<tr>
<td>Project Planning</td>
<td>• Estimates of project planning parameters are established and maintained.</td>
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<tr>
<td></td>
<td>• A project plan is established and maintained as the basis for managing the project.</td>
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<td></td>
<td>• Commitments to the project plan are established and maintained.</td>
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<tr>
<td>Project Monitoring and Control</td>
<td>• Actual project performance and progress is monitored against the project plan,</td>
</tr>
<tr>
<td></td>
<td>• Corrective actions are managed to closure when the project's performance or results deviate significantly from the plan.</td>
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<tr>
<td>Process and Product Quality Assurance</td>
<td>• Adherence of the performed process and associated work products to applicable process descriptions, standards, and procedures is objectively evaluated.</td>
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<td>• Noncompliance issues are objectively tracked and communicated, and resolution is ensured.</td>
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<tr>
<td>Measurement and Analysis</td>
<td>• Measurement objectives and activities are aligned with identified information needs and objectives.</td>
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<tr>
<td></td>
<td>• Measurement results, which address identified information needs and objectives, are provided.</td>
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<tr>
<td>Configuration Management</td>
<td>• Baselines of identified work products are established</td>
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<tr>
<td></td>
<td>• Changes to the work products under configuration management are tracked and controlled.</td>
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<tr>
<td></td>
<td>• Integrity of baselines is established and maintained.</td>
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</table>
Manifesto for Agile Software Development

We are uncovering better ways of developing software by doing it and helping others do it.
Through this work we have come to value:

- **Individuals and interactions** over processes and tools
- **Working software** over comprehensive documentation
- **Customer collaboration** over contract negotiation
- **Responding to change** over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

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Agile Principles

1. Customer satisfaction by early and continuous delivery of valuable software.
2. Welcome changing requirements, even in late development.
3. Working software is delivered frequently (weeks rather than months).
4. Close, daily cooperation between business people and developers.
5. Projects are build around motivated individuals, who should be trusted.
6. Face-to-face conversation is the best form of communication (co-location).
7. Working software is the principal measure of progress.
8. Sustainable development, able to maintain a constant pace.
9. Continuous attention to technical excellence and good design.
10. Simplicity – the art of maximizing the amount of work not done – is essential.
11. Best architectures, requirements, and designs emerge from self-organizing teams.
12. Regularly, the team reflects on how to become more effective, and adjusts accordingly.
## Developmental Sequence in Small Groups

<table>
<thead>
<tr>
<th>Group Structure</th>
<th>Task Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>The pattern of interpersonal relationships</td>
<td>The content of interaction as related to the task at hand</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Forming</th>
<th>Storming</th>
<th>Norming</th>
<th>Performing</th>
<th>Adjourning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation, testing, and dependence</td>
<td>Resistance to group influence and task requirements</td>
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<td></td>
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<tr>
<td>Ingroup feeling and cohesiveness develop; new standards evolve and new roles are adopted</td>
<td>Open exchange of relevant interpretations; intimate, personal opinions are expressed</td>
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<tr>
<td>Roles become flexible and functional; structural issues resolved; structure can support task performance</td>
<td>Interpersonal structures become the tool of task activities; group energy channeled into the task; solns emerge</td>
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<tr>
<td>Anxiety about separation and termination; sadness; feelings toward leader and group members</td>
<td>Self-evaluation</td>
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</tbody>
</table>

Testing and independence | Orientation to the task |
Intragroup conflict | Emotional response to task demands |

[http://openvce.net/sites/default/files/Tuckman1965DevelopmentalSequence.pdf](http://openvce.net/sites/default/files/Tuckman1965DevelopmentalSequence.pdf)
Teamwork Questionnaire

1. What are your expectations about what your team will accomplish this semester?
2. What are your personal goals for improving your teamwork and communication skills this semester?
3. What kinds of obstacles might you encounter in trying to reach both your team and personal goals?
4. What happens if some people on the team want to get an “A” while others think a “B” will be acceptable?
5. Is it acceptable for some team members to do more work on the assignment in order to get an “A”? 
6. How much time per week do you anticipate it will take to make the project successful?
7. How will you decide who should do what on the project and activities?
8. What will happen if someone doesn’t follow through on a commitment (missing deadline, no show, etc.)?
9. What happens if people have different opinions on the quality of the work?
10. How will you deal with different work habits of team members?
11. Do you want to have a standing meeting time outside of class?
12. How often do you think the team will need to meet outside of class?
13. Will you need approval of every team member before making a decision?
14. What will you do if every team member except one agrees on something?
15. How often will you rotate the facilitator position? How will you decide on whose turn it is to facilitate?
16. What will you do if one person seems to be dominating the team process?
17. What will you do if you feel most of the facilitation responsibilities are falling on you?
18. Is it generally easier to reach you by text, email, vmail or something else? What hours?