

# PAIR MODELING

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## Agenda

- Historical Contexts of Pairing
- Motivation for Pair Modeling.
- Definition of Pair Modeling.
- Utility of Pair Modeling.
- Scope of Pair Modeling.
- Agile Modeling and Pair Modeling.
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- Realization of Pair Modeling.
- Pair Modeling and Quality Assurance.
- Pair Modeling in Education.
- Pair Modeling Survey: Lies, Damn Lies, and Statistics.
- Pair Modeling Research Problems.
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## Historical Contexts of Pairing

- Authoring Patterns.
  - The Shepherd is Assisted by the Author in Attaining the Submission the Status of a Candidate Pattern.
  - The Trust and Collaboration Between the Two is Crucial for Success of Shepherding.
- Pair Programming.
  - Pair Programming is One of the Twelve Founding Principles of XP.
  - The Focus in Pair Programming has Exclusively been on Implementation
  - Modeling is Not Programming (and, to a Certain Extent, Vice Versa).

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## Motivation for Pair Modeling

- Modeling Central in Adaptive Software Process Environments (XP, RUP) used in the Industry.
- Models are becoming Complex Enough for an Individual, Large in Number, and Require Social Acceptance.
- Question:  
How can Models be Created Cooperatively Within the Context of the Project Team?

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## Definition for Pair Modeling

- Pair Modeling is a Modeling Practice That Involves Two People:
  - One Person (the Primary Person or the Pilot) Works on the Model Using Some Input Device.
  - The Other (the Secondary Person or the Co-Pilot) Provides Support in Decision Making and Provides Input and Critical Feedback on All Aspects of the Model as it Evolves.
- Pair Modeling is about Collaborative Modeling.

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## Pair Characteristics

- The Primary Role is Active but the Secondary Role is Not Passive.
- The Primary and Secondary Roles Interchange Periodically as Appropriate.
- If the Pair is a Part of a Team with More Than Two Members, the Structure of the Pair can also Change.

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## Utility of Pair Modeling

- **Domain Modeling.**
  - Conceptual (Domain) Modeling Requires Deliberating the Required Concepts, Properties, and Relationships in a Domain in a Shared Environment.
  - Understanding the Domain Involves the Activity of Knowledge Acquisition: Each Partner Can Help Ask and Answer the Competency Questions Involved.
- **Modeling Style.**
  - Application of Established Entities of Knowledge (Guidelines, Patterns, Refactoring Methods, or Standards) Often Requires Decision Making with an Outward Look, Beyond Oneself.

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## Scope of Pair Modeling

- **Low Emphasis on Modeling.**
  - It is Not Automatic that an Organization may have the Resources (People, Budget, Availability of Tools) to Commit to Pair Modeling.
  - An Organization Software Process Maturity is Less Than CMM Level 3.
- **Instability in Bonding.**
  - Unpredictability Usually Impacts Negatively on Team Dynamics.
  - If there is a High Probability of Instability in the Status of the Pair Being Together, Pair Modeling is Not a Recommended Practice.

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## Agile Modeling

- Agile Modeling Is a Practice-based Methodology That Consists of a Collection of Values, Principles, and Practices for Modeling Software.
- The Goal of Agile Modeling is to Produce Stakeholder-Centered Light-Weight Models, Sufficiently Quality-Oriented (Accurate, Communicable, Consistent, Detailed, Minimal, Simple, ...), and Created Incrementally.

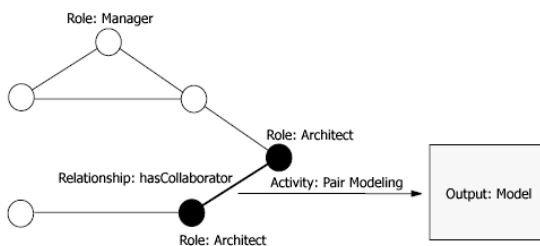
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## Agile Modeling and Pair Modeling

- Values of Agile Modeling – Communication, Simplicity, Feedback, Courage, and Humility – Are Also Important for Pair Modeling.
- Pair Modeling is About the Agile Modeling Practice of Model With Others.
- Other Practices of Agile Modeling – Active Stakeholder Participation, Model in Small Increments, Apply Modeling Standards, Apply Patterns Gently – Can Be Given Due Diligence.

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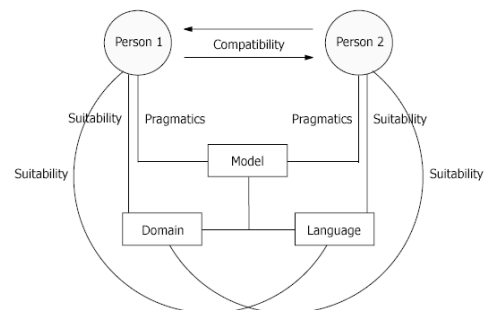
## Pair Modeling Ecosystem



People in a Team Structure have a Role to Play in the Practice of Pair Modeling .

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## Pair Modeling Ecosystem



The Success of Interaction of Persons with the Environment in the Practice of Pair Modeling Requires a Certain Degree of Appropriateness.

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## Pair Modeling Cost-Benefit Analysis

- Pair Modeling Costs Must Be Measured Against the Benefits for Social, Technical, and Economical Feasibility.
- Concerns:**
  - The Infrastructure Requires a "Neutral" Computer (or Computer Monitor).
  - Pair Modeling Involves Two People: There is an Explicit Dependency.
  - Time Spent in Discussions May Be Counterproductive.
  - Doubling the Number of People Involved in the Modeling Process Does Mean Double the Employment Cost. However, It Does Not Mean Double the Productivity.

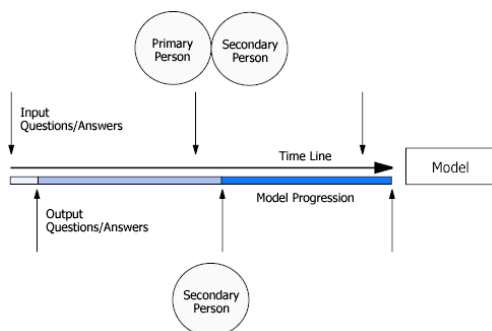
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## Realization of Pair Modeling

- Pair Modeling Comprises of a Sequence of Steps Involving Two Main Tasks:
  - Discussion.
    - Useful if Equipped with Questions/Answers.
  - Drawing/Writing.
    - Requires Necessary Skills.

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## Pair Modeling Discussion: Q/A's



The Model is Steered Towards Completion as Questions are Asked and Answered by Partners.

## Pair Modeling and Quality Assurance

- Addressing the Issue of Quality Early (Models Created During Requirements and Design) is Crucial.
- If Left Unattended, Issues can Arise:
  - Problems can Propagate into Later Stages of Development.
  - Models Fail to Communicate.
  - Models Mislead.
  - Models are Virtually Non-Modifiable.

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## Pair Modeling and Quality Assurance

- Inspections are a Rigorous Form of Auditing Based Upon Peer Review.
- Two Concerns in Making Appropriate Use of Inspections:
  1. Cost-Effectiveness
  2. Dependency of Adoption Based Upon Organizational Maturity.
- Pair Modeling in Part could be Viewed as "Inspections in the Small".

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## Pair Modeling in Education

- Software Engineering Projects are Usually Assigned and Worked Upon in Teams.
- The Transition From Individual to a Team Effort can be Challenging/Overwhelming to Students Used to Working Solo.
- There is Need for a Small, Manageable Environment Where Students can Learn What Working in a Team Means.
- Pair Modeling Provides This Opportunity.

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## Lies, Damn Lies, and Statistics

- A Survey on Pair Modeling of Both Undergraduate and Graduate Students was Conducted in Fall 2004.
- The Following Concerns Were Highlighted by 25 Respondents:

Issue of How the Work Done will be Credited, Distractions of Several Pairs in a Close Setting, and Potential for Conflicts.
- These Concerns Need to be Taken Into Account by the Educators that Plan to Deploy Pair Modeling.

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## Pair Modeling Research Problems

- Draw Further Comparisons and Contrasts Between Pair Modeling and Agile Modeling.
- Systematic Initiative towards Quality Considerations (Productivity, Satisfiability) Need a Measurement Framework.
  - Deriving Relevant Metrics for Pair Modeling and Formally Validating them Against the Representational Theory of Measurement.

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## Conclusion

- If We Aspire to Work on Projects Conducted in Large Teams, We Must First Learn How to Do That on the Smallest Scale: Two's a Company.
- Pair Modeling Provides the First Step in the Transition from an Individual Modeling Effort to a Social Collaboration.
- To Put That Into Practice, We Also Need to Acknowledge the Differences of Concerns of Pair Modeling Between Educational and Industrial Settings.

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