

# Planning Poker

## Playing for Better Estimates

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# Agenda

- The crowd: mad or wise?
- Planning Poker
- Case study: Estimation accuracy with Planning Poker
- Advantages and hazards of Planning Poker
- Variations of Planning Poker
- Alternatives to Planning Poker
- Q&A



# The Crowd: Mad or Wise?

**“Men, it has been well said, think in herds; it will be seen that they go mad in herds, while they only recover their senses slowly, and one by one.”**

- *Extraordinary Popular Delusions and the Madness of Crowds*, Charles Mackay, 1841

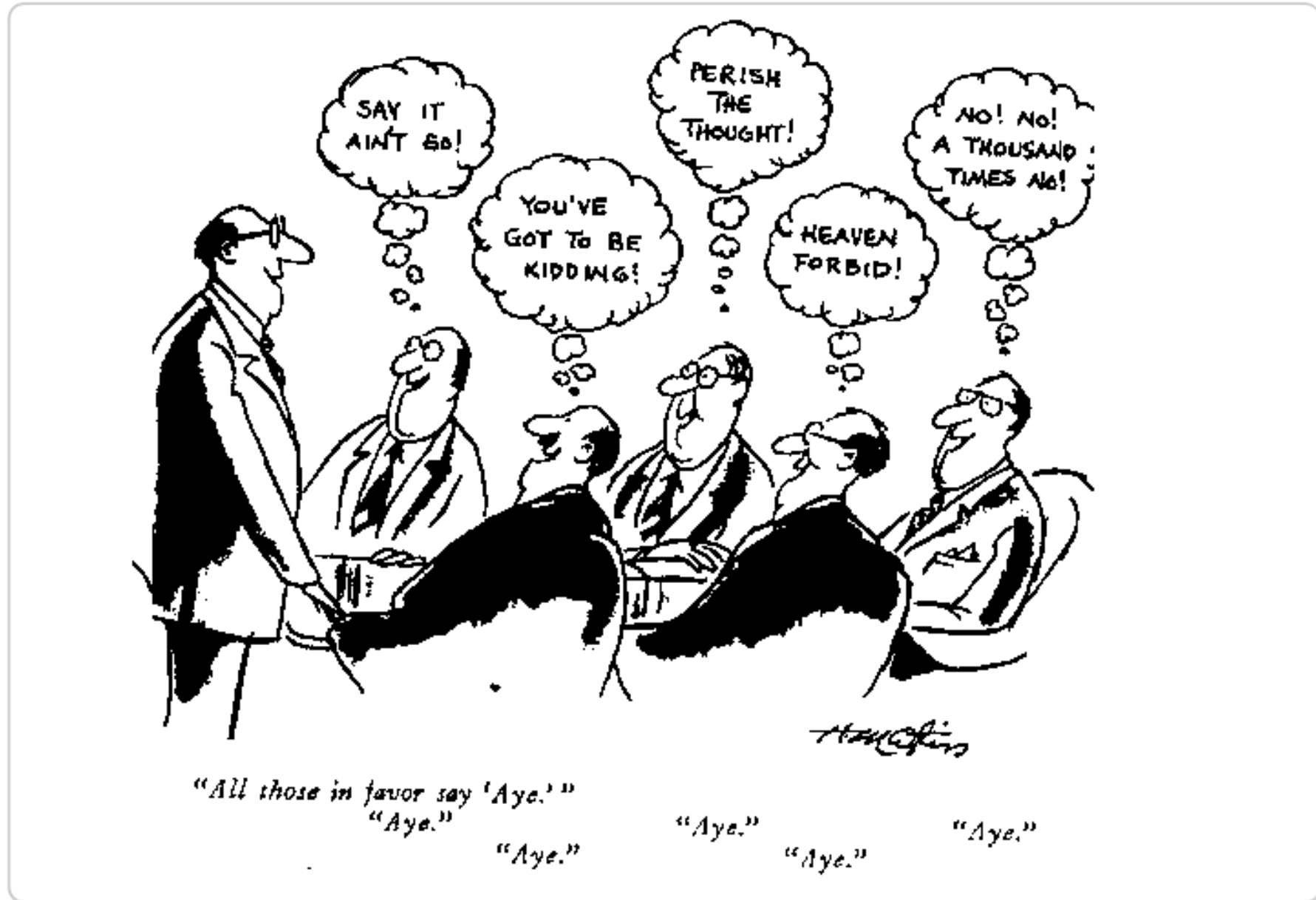
**“If you put together a big enough and diverse enough group of people and ask them to make decisions affecting matters of general interest, that groups decision will, over time, be intellectual superior to the isolated individual...”**

- *The Wisdom of Crowds*, James Surowiecki, 2004



## Groups have often been found to have a negative impact on decision making

- Early psychological literature investigated and described many potential hazards
- "Groupthink" – general term used to describe a condition leading to suboptimal decisions:
  - Participants who were similar in background, viewpoint, agenda etc.
  - Lack of dissenting voices (either due to similarity or pressure)
  - Presumptions of an already certain outcome (e.g. leaders decision)
- "Risky shift":
  - Tendency that willingness towards risk was enhanced by group interaction
  - Found in studies of doctors, judges, burglars (!), stock-traders, "regular people" posed with social dilemmas etc.





## A different view of groups

- More recent research perspectives have offered insight
- The "Risky Shift" effect was extended to a more general effect labeled "Group Polarization"
  - A groups tendency to have more extreme decisions than the average of individuals opinion
  - Optimistic tendencies are enhanced in groups ("risky shift")
  - Cautious tendencies are enhanced in groups
- Exploration of many of the groups opportunities
  - When are groups appropriate?
  - Under which circumstances?
  - How do you optimize a groups process and decision?



## General conditions which facilitate good decision making in groups (according to Surowiecki)

- Diversity (among the participants)
  - In knowledge (education, project experience)
  - Personality (optimism)
  - Viewpoint (company role (political), project responsibility)
  - Variation in a sociological context is not relevant
- Independence (from influence of others)
  - Relative freedom keeps errors from being aligned in the same direction
  - More likely to add new data
- Decentralization (of decision makers)
  - Introduction of specific and/or local knowledge
  - Specialization of competence
  - Encourages independence



## Can groups be beneficial in a software estimation context?

- As of today, most of you are probably subject to a series of group processes when estimating a project
- Warning!
  - Much of the “traditional” software engineering literature misinterprets and simplifies psychological research on groups
  - Lack of empirical research
- Research in software estimation has found that group processes might reduce over-optimism, and increase estimation accuracy, but there are many aspects to consider
  - Which process is used to combine estimates?
  - How is the project climate (customer, priorities, management)?
  - Who are the participants?





# Typical conditions when estimating software projects

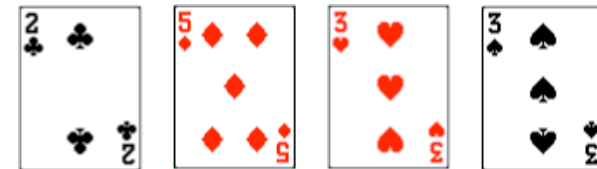
- Often not independence and decentralization, but hopefully diversity
  
- However, you have other advantages:
  - Motivation to perform together with your colleagues
  - Competence on what you are doing
  - The opportunity to share *relevant* information
  
- The pitfalls of group processes may be avoided, and properties such as independence and decentralization may be achieved, depending on *how* you combine estimates



# Planning Poker

- Group estimation process
- Described by Grenning and Cohn

1. Customer explains story
2. Team discusses work involved
3. Everybody estimates individually
4. Everybody reveals estimate simultaneously
5. Lowest and highest estimator justifies
6. Team decides on collective estimate





# Case Study: Planning poker introduced to XP team

- Goal: Compare estimation performance in release planning
  - Unstructured group estimation
  - Planning poker
  
- Estimates from XP team developing system for capturing and managing orders for home broadband service
  - New release every 2-3 months
  - Estimates from release planning used throughout release
  
- Team
  - 15-20 people per project (8-12 developers)
  - Mix of customer employees, consultants and independent contractors



## Estimation in release planning

### ■ Unstructured group process

- Customer explains story
- Work involved discussed
- Estimate volunteered
- Consensus sought

### ■ Planning poker process

- Customer explains story
- Work involved discussed
- Individual estimating
- Estimates revealed
- Estimates justified
- Collective estimate decided

### ■ Issues

- Varying level of participation —————> Resolved!
- Slow process —————> Resolved!
- Possible anchoring effect —————> Well?



## Data analysed

- Data collected from 4 subsequent releases of system
  - Order: Unstructured group x 2, Planning poker x 2
  - Organised in two sets: Unstructured group and Planning poker
- Most likely estimates
  - pair days
  - half day resolution



## Straight-forward analysis

Estimation process	n	Mean RE	Median MRE	MRE distribution		
				< 0.20	0.20–0.39	≥ 0.40
Unstructured group	51	-0.08	0.33	16	16	19
Planning poker	50	-0.26	0.25	23	5	22

- RE = Relative Error = (actual effort - estimated effort) / actual effort
  - Underestimation:  $(2 - 1) / 2 = 0.5$
  - Overestimation:  $(1 - 2) / 1 = -1.0$
- MRE = Magnitude of Relative Error = | RE |



## Estimates can be impacted by many factors

- Size of tasks
- Estimation experience
- Skills in use of estimation model
- Skills in selection of estimation model
- Project managers' ability to control cost
- Project member skills
- Client and subcontractor performance
- Completeness and certainty of information
- Project priorities
- Terminology and measures
- Recording of data
- Selection of projects



## Planning poker better for all familiar tasks

Estimation process	Small tasks (< 2 pair days)			MRE distribution		
	n	Mean RE	Median MRE	< 0.20	0.20–0.39	≥ 0.40
Unstructured group	30	0.12	0.42	11	4	15
Planning poker	21	-0.40	0.25	10	2	9

Estimation process	Large tasks (≥ 2 pair days)			MRE distribution		
	n	Mean RE	Median MRE	< 0.20	0.20–0.39	≥ 0.40
Unstructured group	14	0.05	0.25	4	7	3
Planning poker	16	-0.16	0.00	11	3	2





## Planning poker worse for unfamiliar tasks

Estimation process	Small tasks (< 2 pair days)			MRE distribution		
	n	Mean RE	Median MRE	< 0.20	0.20–0.39	≥ 0.40
Unstructured group	4	0.58	0.50	0	2	2
Planning poker	7	0.13	0.80	1	0	6

Estimation process	Large tasks (≥ 2 pair days)			MRE distribution		
	n	Mean RE	Median MRE	< 0.20	0.20–0.39	≥ 0.40
Unstructured group	3	-0.24	0.40	1	0	2
Planning poker	6	-0.43	0.58	1	0	5



## Why does planning poker work?

- Simultaneous display of estimates prevents bias
- More questions asked and more information shared
- Broader range of developers provide estimates
- Estimates better reflect team's average ability to solve task
- Team feels more ownership to estimates



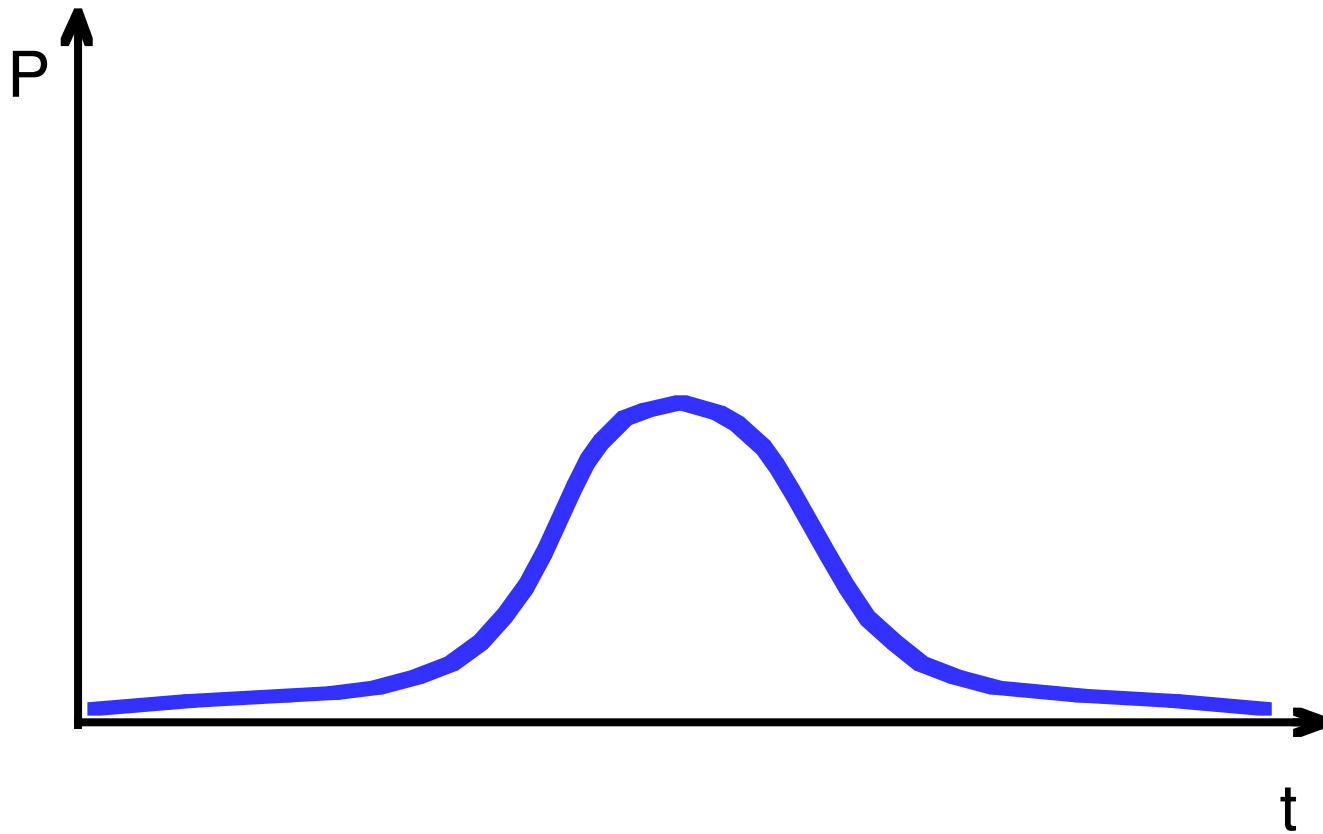
## Hazards of planning poker

- Lack of decentralization and independence may make the group decision vulnerable to peer-pressure
- The “anchor-effect” can have an impact
- The unstructured discussion might inflate the workload in each task (a lot of heads might introduce many aspects to a single task)



# What are we doing when we're estimating tasks?

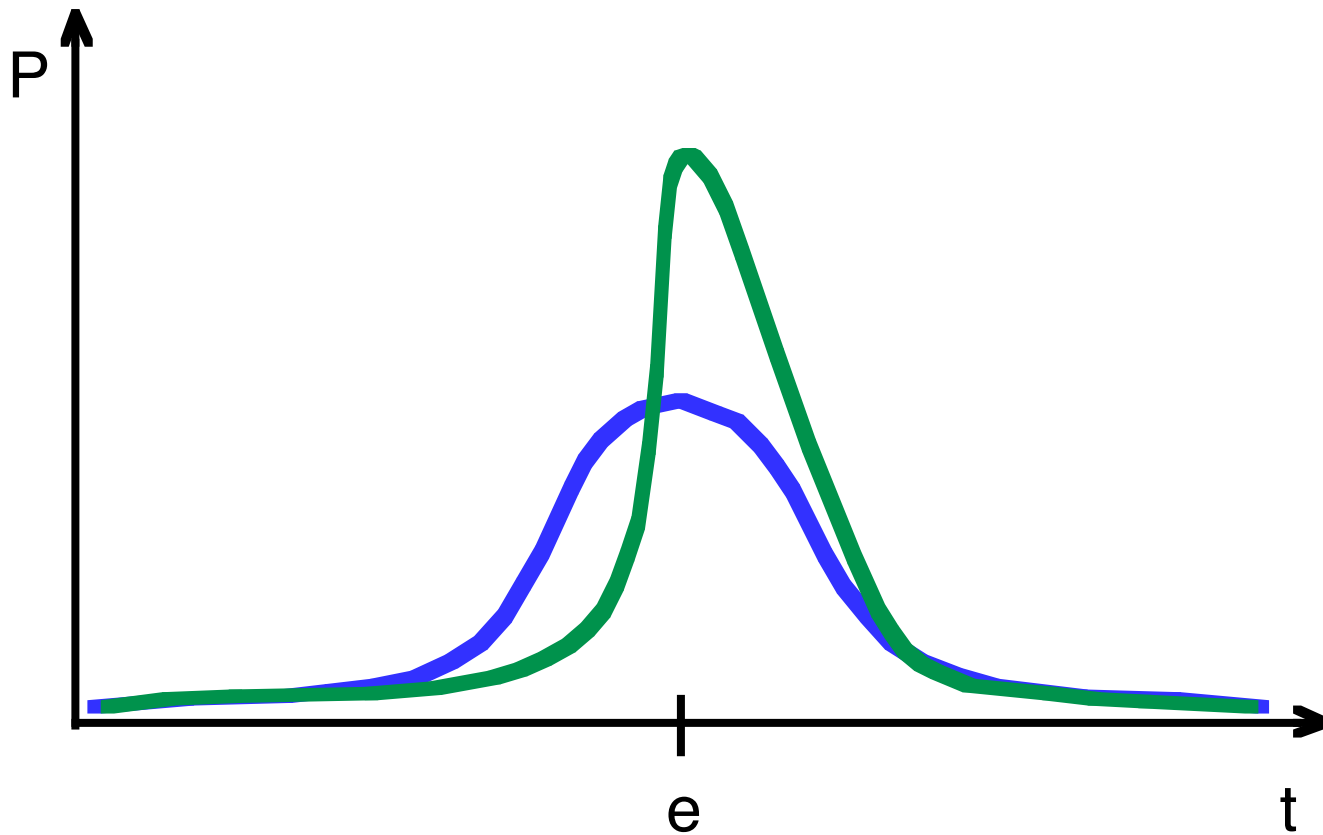
- Not like predicting the weather!





# What are we doing when we're estimating tasks?

- Not like predicting the weather!





## What are we doing when we're estimating tasks?

- Not like predicting the weather!
- Establishing a reasonable cost (time)
- But, there's also scope and quality!
  - $t = S * Q$
- Does your estimation process define scope and target quality?



## When to use Planning Poker?

- Release Planning
  - customer picks features for next release
  - estimates basis for prioritising features and staffing
- Detailed planning (iteration) and design
  - breaking features into tasks and assigning responsibility
  - planning poker facilitates design discussion



## How should we estimate?

- What should we estimate in?
  - Ideal days? Points? Gummy bears?
- Estimate complexity
- Aim for consistency
- Translate to real time when planning
  - Measure project velocity and apply yesterdays weather
  - Add contingency to project





## Should we use fixed or flexible estimates?

- Instead of having cards with fixed estimates, have participants write up their estimate on a piece of paper
  
- Fixed estimates easier and more effective
  - Experiments with flexible estimates indicates that the group tends to standardise on a few fixed sizes anyway
  - Less options, less thinking time
  - Fibonacci-sequence is effective: 1, 2, 3, 5, split
  
- Remember: these are estimates
  - We don't need the added precision flexible estimates might give us
  - One hour to or from is usually not important



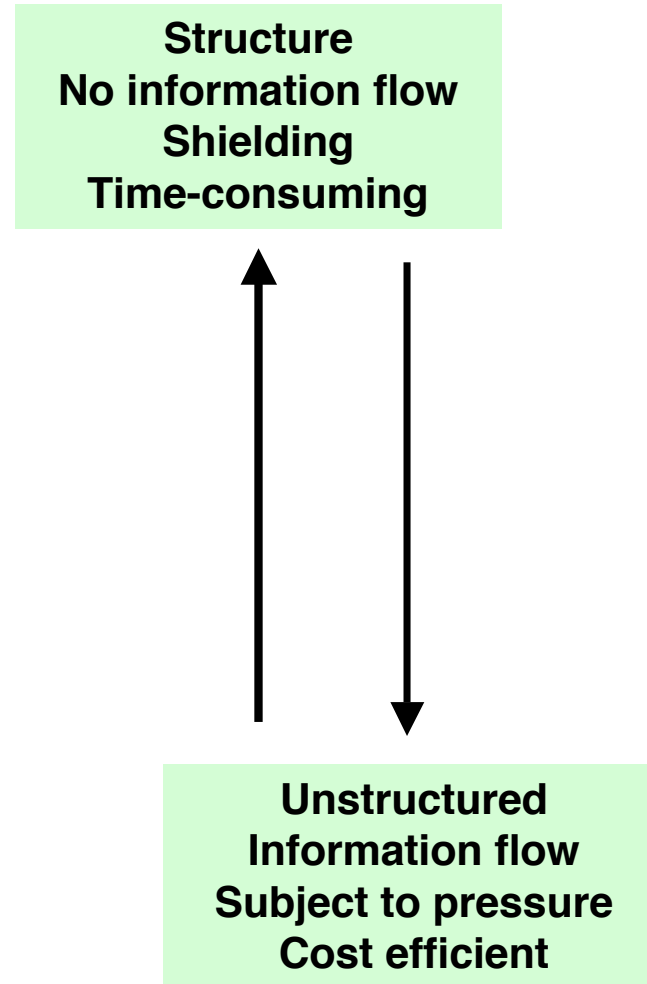
## Should we seek consensus or go with the average?

- Justification of estimates after first round of poker is important for revealing more details
- Multiple rounds of poker when individual differences are big
- Average or go with majority when differences are small



## Different methods to combine estimates in groups

- Delphi
- Wideband-Delphi
- Planning Poker
- Unstructured groups





## Possible benefits on combining estimates in groups related to increasing accuracy

- Combines knowledge from several sources
- Avoids only having estimates from the “most senior” individual
- Moderation of obviously wrong estimates
  - More likely to be detected by a group
  - Less variance
  - More consistency



## Possible benefits on combining estimates in groups related to increasing accuracy (2)

- Synchronizes the participants upfront on perspectives of what the estimates includes regarding activities and assumptions
- Ensures that different parts of an estimate is treated more thoroughly
- More willingness to identify optimism in other peoples estimates than in ones own



## Other benefits, related to project progress

- The participants gets more ownership of estimates they themselves have participated in deriving
  - Estimates are not forced
  - More motivation to work towards estimates
  - Easier to estimate ones own work
- Uncertainty related to the implementation is discussed and handled at an early stage
- Reduced need for discussion during project execution



## Summary

- Combination of estimates may increase accuracy
- Strive for diversity, independence and decentralization
- Use group discussions also to increase motivation, increase ownership, sort out ambiguities and define scope and target quality for each task
- Planning Poker is an effective way to facilitate group discussions and collect and combine individual estimates

Questions?



HUSK:  
NM i Estimering  
19:30 i møterom Stockholm

Mye å lære og mulighet til å  
bli den første norgesmester i estimering!

# Invitation to the Simula Estimation Seminar 2006

- Simula Research Laboratory has the pleasure of inviting you to our annual estimation seminar.

The seminar is aimed at professionals and researchers interested in software estimation. You will hear talks from internationally renowned lecturers and researchers, and get up to date on some the most recent developments in software estimation. The seminar will consist of lectures and interactive sessions.

**The seminar will take place on tuesday 21<sup>st</sup> of November at Simula Research Laboratory, located at IT-Fornebu just outside of Oslo.**

The seminar, including lunch, is free of charge, and we encourage early registration as we expect a full venue. Participants can contact Stein Grimstad for registration ([steingr@simula.no](mailto:steingr@simula.no)). Please include names and email addresses of all participants in the registration.

The seminar will be held in English and Norwegian. All material will be in English.

For more information about our research on estimation, please visit [www.simula.no/best](http://www.simula.no/best)

## Agenda

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<b>0830</b>	Coffee	
<b>0900</b>	Welcome	<i>Dag Sjøberg</i>
<b>0915</b>	Agile Estimating and Planning	<i>Mike Cohn</i>
<b>1015</b>	Interactive session	<i>Magne Jørgensen</i>
<b>1045</b>	Break	
<b>1100</b>	Know when to hold 'em, know when to fold 'em... Combining estimates with Planning Poker	<i>Kjetil Moløkken-Østvold Nils Christian Haugen</i>
<b>1145</b>	How to avoid impact from irrelevant and misleading information on your estimates	<i>Magne Jørgensen Stein Grimstad</i>
<b>1230</b>	Lunch	

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## References

- *Group Processes*, Rupert Brown, 2001
- *The Wisdom of Crowds*, James Surowiecki, 2004
- *An Empirical Study of Using Planning Poker for User Story Estimation*, Haugen, N.C., Agile Conference, 2006
- *Group Processes in Software Effort Estimation*, K. J. Moløkken-Østvold and M. Jørgensen, Empirical Software Engineering 9(4):315--334, 2004.