



# COCOMO II Rating Scale Elaborations

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## Motivation

- Recent experience has shown that engineers have difficulty in rating some of the COCOMO II Drivers
- Researchers have documented impact of COCOMO Drivers subjectivity
- Calibration data appears to show some differences in the interpretation of COCOMO II Driver ratings

- **We would like to address these problems**



# Examples of Questions

Programmer Capability – What is the 75<sup>th</sup> percentile?

<b>PCAP</b>	15th percentile	35th percentile	55th percentile	75th percentile	90th percentile
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Database Size – Are you mixing two different units of measure?

<b>DATA</b>		(DB bytes / Pgm SLOC) < 10	10 ? D/P < 100	100 ? D/P < 1000	D/P > 1000
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Required Software Reliability – What if my application is not financial?

<b>RELY</b>	slight inconvenience	low, easily recoverable losses	Moderate, easily recoverable losses	high financial loss	risk to human life
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# PCAP Elaboration Example -1

## Programmer Capability (PCAP)

The quality of the programming team's deliverables is adequate. For example: program specifications, unit test specifications, unit test results, peer reviews, program documentation

Completely Disagree	Strongly Disagree	Generally Disagree	Generally Agree	Strongly Agree	Completely Agree
0	1	2	3	4	5

The programming team communicates and cooperates with the project team. For example: project manager, analysts, designers, testers etc.

Completely Disagree	Strongly Disagree	Generally Disagree	Generally Agree	Strongly Agree	Completely Agree
0	1	2	3	4	5

The programming team meets the delivery targets for their work products.

Completely Disagree	Strongly Disagree	Generally Disagree	Generally Agree	Strongly Agree	Completely Agree
0	1	2	3	4	5



# PCAP Elaboration Example -2

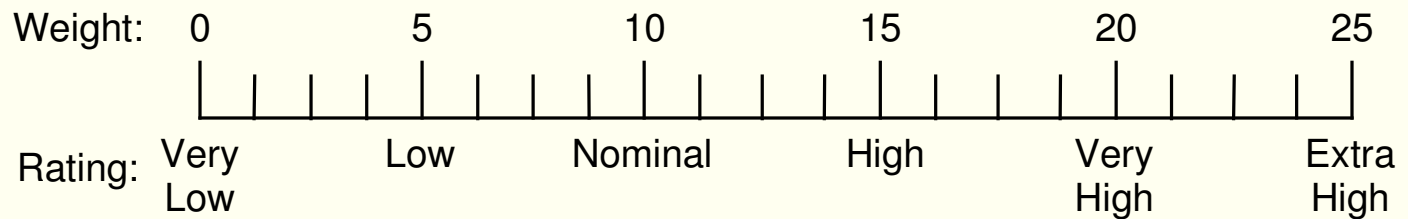
The programming team inspects their work products (peer reviews, walkthroughs).

Completely Disagree	Strongly Disagree	Generally Disagree	Generally Agree	Strongly Agree	Completely Agree
0	1	2	3	4	5

The programming team unit tests their application components.

Completely Disagree	Strongly Disagree	Generally Disagree	Generally Agree	Strongly Agree	Completely Agree
0	1	2	3	4	5

Sum the choices to determine the appropriate ratings. Intermediate ratings are appropriate if the sum falls between two rating descriptors. Circle the rating:





## PCAP Elaboration Example -3

<b>14. PERS/PCAP - Programmer Capability</b>	
15th percentile.	<b>14.1) The programmers assigned to the project can be considered to be in the 1-15 (VERY LOW) bracket on a 0-100 scale with respect to their capability - programming, communications &amp; cooperation ability, efficiency, completeness, etc. Experience is NOT an issue here.</b>
	<input type="checkbox"/> Yes - go to question 15.1 <input type="checkbox"/> No - next question
35th percentile.	<b>14.2) The programmers assigned to the project can be considered to be in the 16-35 (LOW) bracket on a 0-100 scale with respect to their capability - programming, communications &amp; cooperation ability, efficiency, completeness, etc. Experience is NOT an issue here.</b>
	<input type="checkbox"/> Yes - go to question 15.1 <input type="checkbox"/> No - next question

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# PCAP Elaboration Example -4

55th percentile.	<p><b>14.3) The programmers assigned to the project can be considered to be in the 36-55 (AVERAGE) bracket on a 0-100 scale with respect to their capability - programming, communications &amp; cooperation ability, efficiency, completeness, etc. Experience is NOT an issue here.</b></p>
	<p>( ) Yes - go to question 15.1 ( ) No - next question</p>
75th percentile.	<p><b>14.4) The programmers assigned to the project can be considered to be in the 56-75 (HIGH) bracket on a 0-100 scale with respect to their capability - programming, communications &amp; cooperation ability, efficiency, completeness, etc. Experience is NOT an issue here.</b></p>
	<p>( ) Yes - go to question 15.1 ( ) No - next question</p>
90th percentile.	<p><b>14.5) The programmers assigned to the project can be considered to be in the 76-100 (VERY HIGH) bracket on a 0-100 scale with respect to their capability - programming, communications &amp; cooperation ability, efficiency, completeness, etc. Experience is NOT an issue here.</b></p>
	<p>( ) Yes - go to question 15.1 ( ) No - next question</p>





# Approach

- Draw on the knowledge and experience of Affiliates in developing selection criteria that is pertinent and useful. Form a working group to electronically collaborate on elaborating COCOMO II Driver definitions
- Interim results presented at CSE Annual Research Reviews and COCOMO/SCM Forums.
- Steps:
  - Rank the Drivers in terms of subjectivity
  - Considers different sources of elaboration
  - Develop a Whitebox analysis that considers a driver's influence on effort by lifecycle phase and activity.
  - Develop selection criteria based on the what others use and Whitebox analysis.
  - Pilot the enhanced selection criteria.



## Anticipated Results

- Improved likelihood that answers to COCOMO II Driver ratings are consistent within and across software development projects
  - Improve consistency of estimates
  - Impact quality of data collection for model calibration



## To Be Continued

There is a workshop Thursday and Friday to discuss this topic and to lay out a plan to proceed.



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