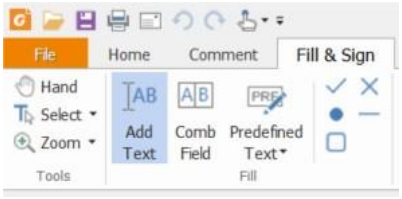
Intro to MCA (Measurement Capability Analysis)

Homework -1

Name	
Employee ID	
Date	
Department	

Instructions :

1. Please use the space provided to write down all the answers and pasting JMP screenshots. Use "Fill and Sign < Add text" in Acrobat Reader to add text to the fields. You can directly paste images in the space provided (after unselecting the Add Text) and then adjust the size to fit the space.



2. Save the file as .pdf (PDF format) and send out via email to the instructor.
3. The email should be titled [subject] " **Intro to MCA – Homework 1**". Copy and paste this title to avoid any typos.
4. Feedback will be provided as comments in the pdf itself and you will be asked to resubmit with corrections (if required). Addition and deletion of comments cannot be done by students. Only instructors can add/delete comments.
5. Please DO NOT send the homework in any other format else your homework will NOT be graded and sent back.

Questions :

Your task is to evaluate automated measurement systems from three different vendors. You hand carried a NIST standard to each vendor to conduct a combined accuracy/repeatability study.

- Equipment: Vendor A, Vendor B, Vendor C
- Application: OLGA Package Dimensions
- Measurement: OLGA X-Dimension
- Spec Limits: 42.500mm +/- 0.100mm

Accuracy Evaluation Description:

- 30 measurements were taken on the NIST standard certified as 42.500 mm.
- The technically significant difference has been determined to be 0.010 mm.
- One operator did all the measurements in one morning.
- The part was removed from the tool and then re-fixtured before each measurement.

Dataset: ***MCA_hw1.jmp*** *[JMP SOS< Sample Data Set Index < MCA Datasets < Homework]*

1. Create a single key graph of the raw data that compare all three systems.

   [*Hints:*

   - ***Use Tables > Stack to re-format data for a single variability chart.***
   - ***Vendor should be on the horizontal axis.***
   - ***Jitter the points. Show the mean for each Vendor.***
   - ***Include a reference line at the standard value.***
   - ***Compute summary statistics for each vendor: mean and standard deviation.]***

Paste your graph (along with summary statistics) here.

Based on the graph and summary statistics on the previous page, answer each of the following questions:

- Which system appears to be the most accurate? Explain why? ***[Hint: This is simply a "relative" comparison]***

- Which system appears to be the least accurate? Explain why?

- Which system appears to be the most precise? Explain why?

- Which system appears to be the least precise? Explain why?

2. Conduct a separate statistical accuracy and repeatability analysis in SOS to validate your observations above and determine the following:

Paste your accuracy SOS assessment here.

Include summary table, distribution and overlay plots for all threevendors.

Paste your repeatability SOS assessment here.

Include summary table, control chart, distribution, andstability/repeatability report for all three vendors.

- Which systems are accurate (no calibration required)? Explain why?

- Which systems are capable for repeatability? Clearly describe the reason.

- Which systems are stable? If not stable, clearly describe the instability.

3. Which vendor would you select to continue to pursue bases on this analysis? Explain why in detail.