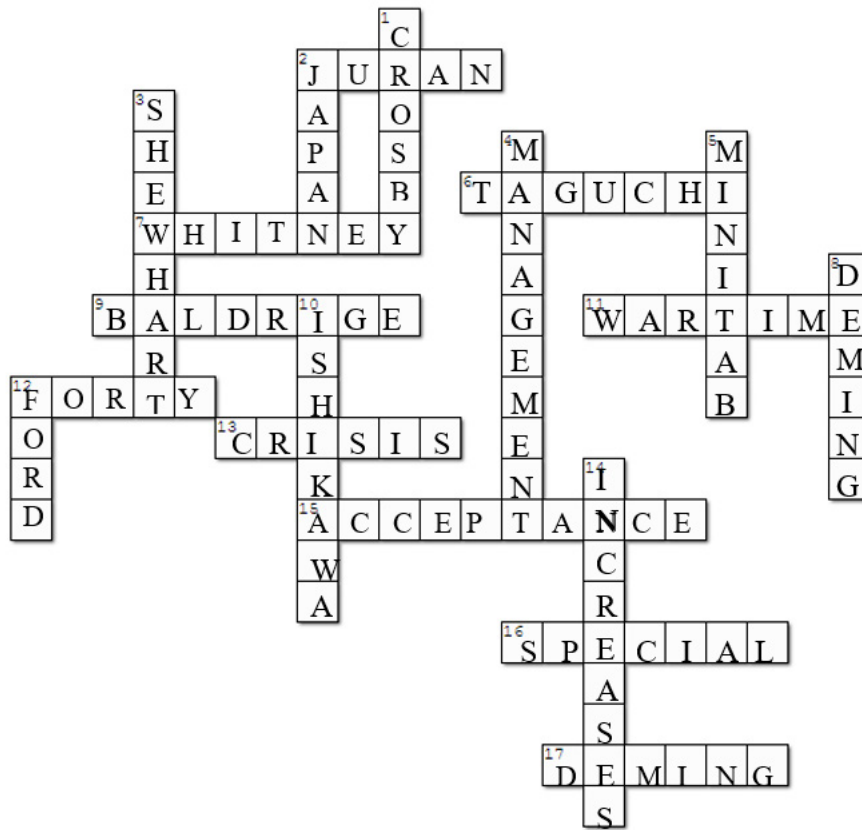


## SPC

## LESSON: History of Quality Control - Homework SOLUTIONS

**Coverage:** Evolution of Quality Control and Important Quality Gurus

Using the materials from Lesson 1 on the Evolution of Quality Control, complete the following crossword puzzle.



Created with TheTeachersCorner.net [Crossword Maker](http://www.theteacherscorner.net)

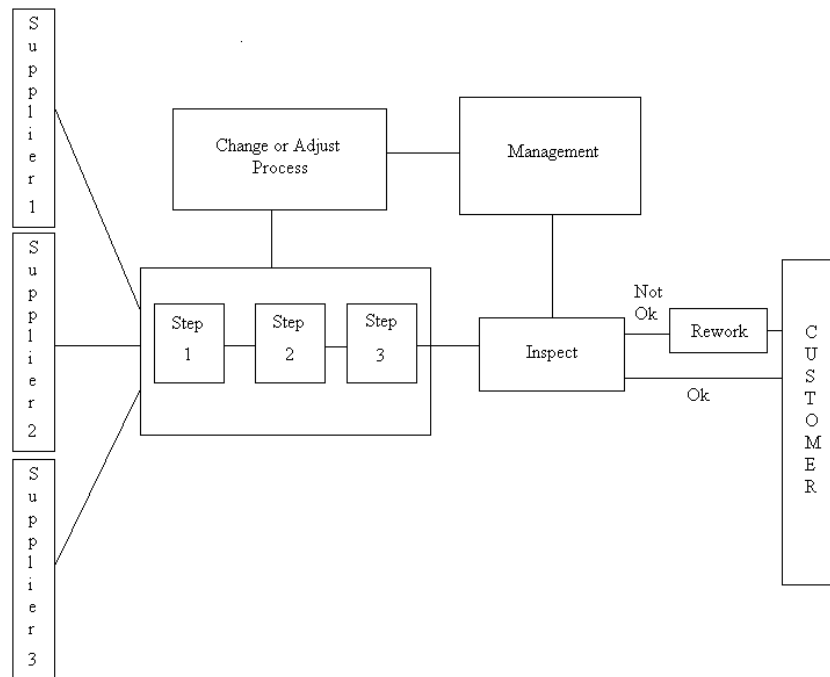
### Across

2. Besides Deming, this is the other quality guru credited with saving Japan's economy after World War II.
6. Important contributor to Design of Experiments.
7. He is credited with 'inventing' interchangeable parts.
9. U.S.'s major award for quality
11. As World War II ended, most U.S. companies viewed quality as just a \_\_\_\_\_ effort
12. Deming's secretary worked for him for \_\_\_\_\_ years.
13. One of the prominent texts in Quality Control is Deming's 'Out of the \_\_\_\_\_.'
15. Dodge & Romig are credited with inventing \_\_\_\_\_ sampling.
16. The control chart is a tool for distinguishing between random (or natural) cause variation and \_\_\_\_\_ cause variation.
17. My advisor's Quality Control class had the privilege of speaking with \_\_\_\_\_.

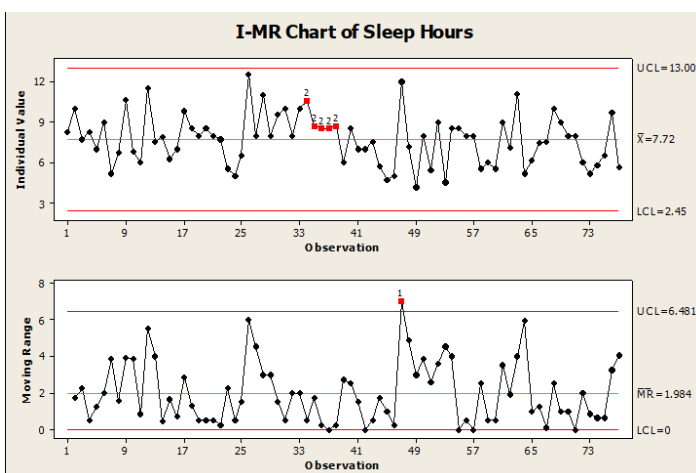
### Down

1. Quality guru who championed 'zero defects.'
2. Deming was brought into Ford in 1981 after they viewed: "If \_\_\_\_\_ Can ... Why Can't We?"
3. The inventor of the control chart
4. Deming quote: 'Quality is the responsibility of \_\_\_\_\_, not the workers.'
5. Statistical software package that we will use in this course.
8. Father of Quality Control
10. Credited with inventing the Cause-and-Effect diagram, also called the fishbone diagram.
12. Who said 'Make the best quality of goods possible at the lowest cost possible, paying the highest wages possible.'
14. Continual process-adjustment in reaction to non-conformance actually \_\_\_\_\_ (increases, decreases) variation.



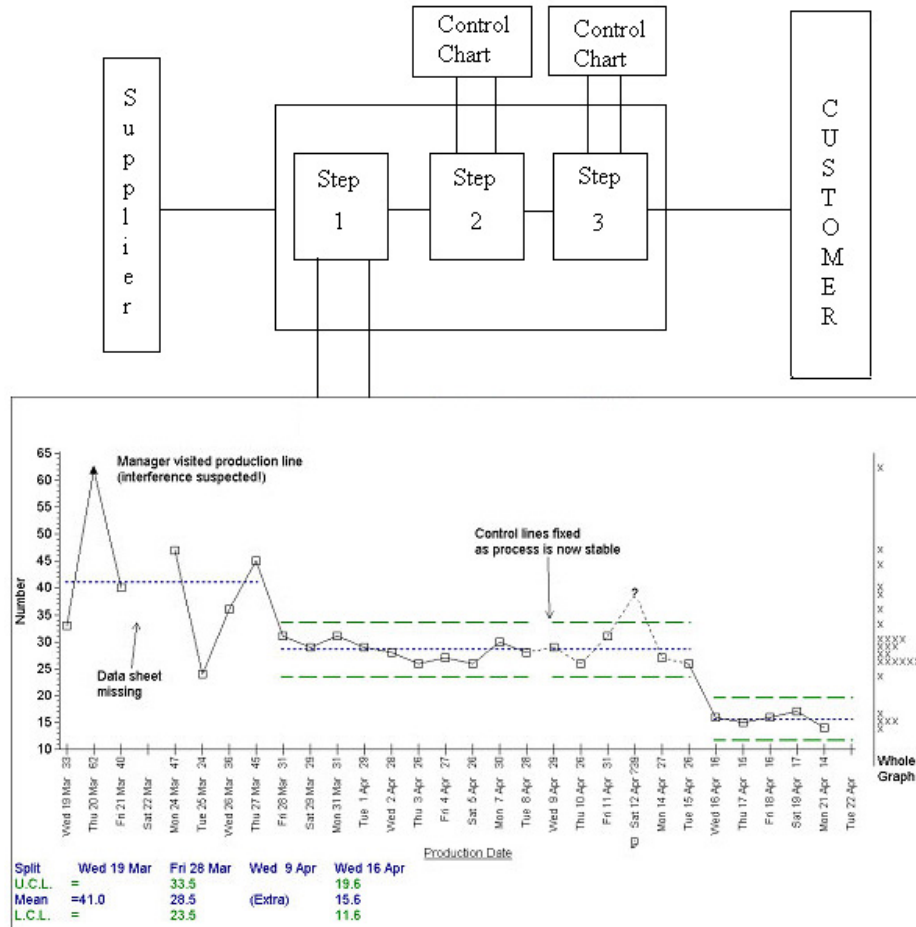


In **1924**, Shewhart framed product variation in terms of *special cause* and *common cause variation*; he introduced the **control chart** as a tool for **distinguishing** between the two. Shewhart stressed the importance of a process being in a state of **statistical control** (only common cause variation present) and keeping it in control – only then could future output be predicted.

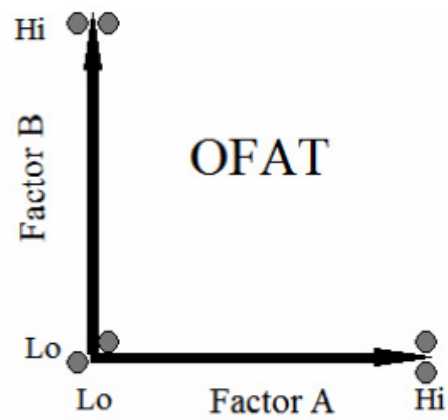
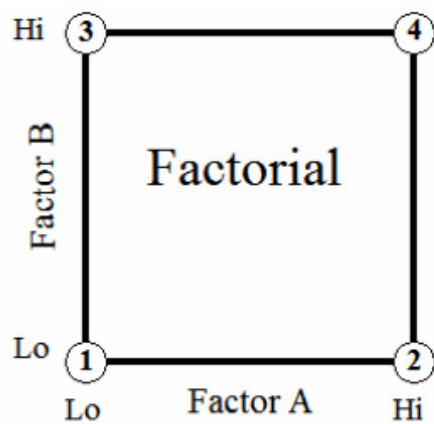
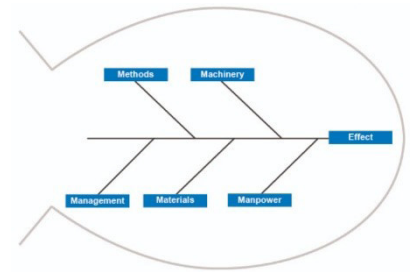


**I chart:** Individual Chart: This student's sleep hours are plotted each day over Winter Quarter.

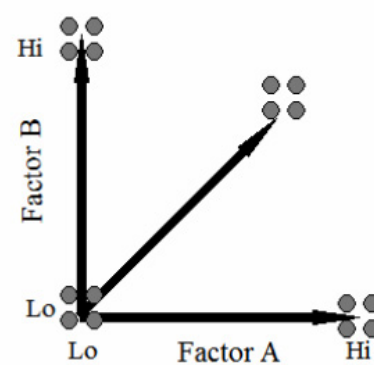
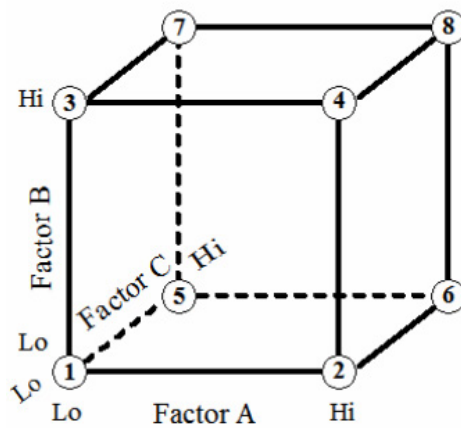
**MR chart:** Moving Range Chart: The absolute value of the difference in this student's sleep hours between two consecutive days are plotted each day over Winter Quarter





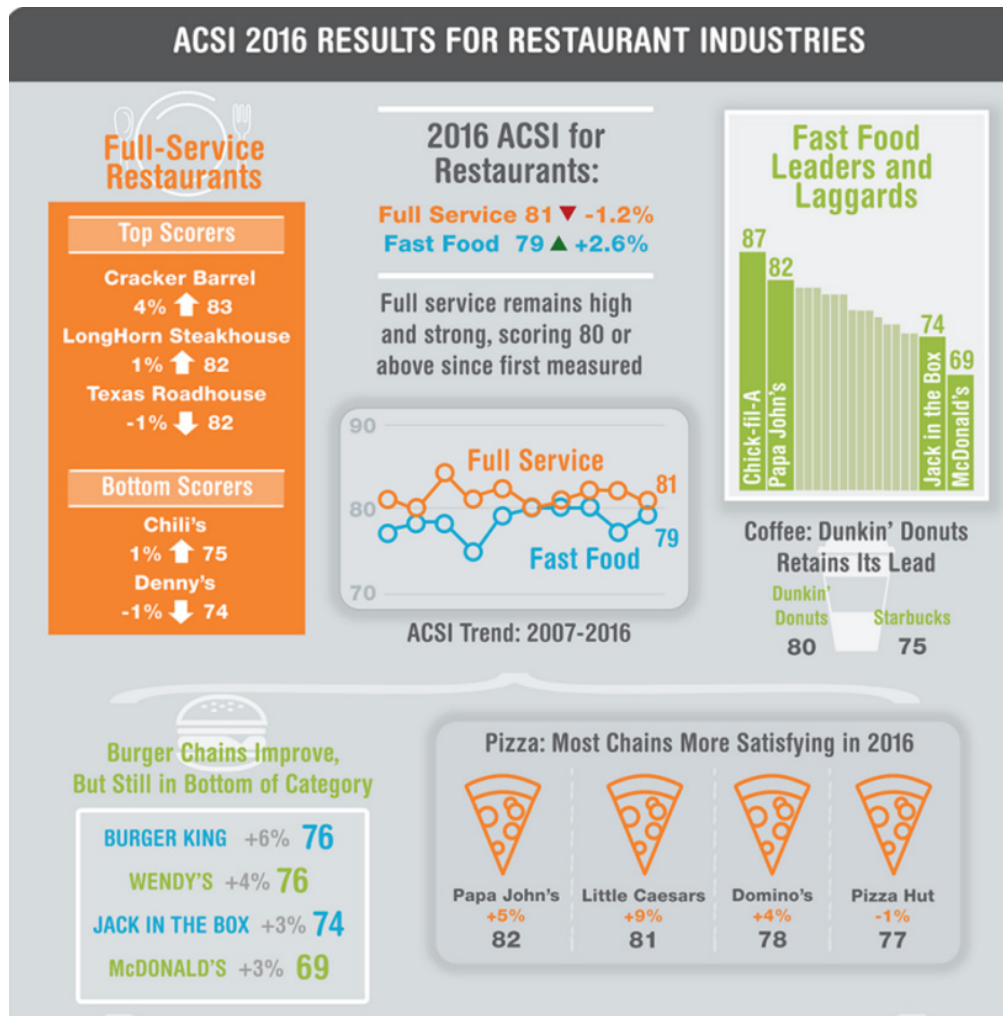


Example: Popping Popcorn: Two factors: Time and Power Level



Speed	Octane	Tire Pressure	Y = MPG
55	85	30	23
60	85	30	24
55	90	30	22
55	85	35	20

Speed	Octane	Tire Pressure	Y = MPG
55	85	30	23
60	85	30	24
55	90	30	22
60	90	30	28
55	85	35	20
60	85	35	21
55	90	35	27
60	90	35	25



ACSI: Limited-Service Restaurants			
Company	2015	2016	% Change
Limited-Service Restaurants	77	79	2.6%
Chick-fil-A	86	87	1%
Papa John's	78	82	5%
All Others	81	81	0%
Little Caesars	74	81	9%
Panera Bread	80	81	1%
Arby's	74	80	8%
Dunkin' Donuts	78	80	3%
Subway	77	80	4%
Chipotle Mexican Grill	83	78	-6%
Domino's	75	78	4%
KFC (Yum! Brands)	73	78	7%
Pizza Hut (Yum! Brands)	78	77	-1%
Burger King	72	76	6%
Wendy's	73	76	4%
Starbucks	74	75	1%
Taco Bell (Yum! Brands)	72	75	4%
Jack in the Box	72	74	3%
McDonald's	67	69	3%

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	16	17	18	19	Previous Year % Change
Chick-fil-A	87	87	87	86	-1.1
All Others	81	82	82	82	0.0
Panera Bread	81	82	81	81	0.0
Papa John's	82	82	80	80	0.0
Arby's (Inspire Brands)	80	80	79	80	1.3
Chipotle Mexican Grill	78	79	79	80	1.3
Pizza Hut (Yum! Brands)	77	76	80	80	0.0
Subway	80	81	80	79	-1.3
Domino's	78	78	79	79	0.0
Starbucks	75	77	78	79	1.3
Limited-Service Restaurants	79	79	80	79	-1.3
KFC (Yum! Brands)	78	78	77	78	1.3
Dunkin'	80	79	78	78	0.0
Wendy's	76	76	77	77	0.0
Little Caesars	81	78	77	77	0.0
Burger King	76	77	76	76	0.0