

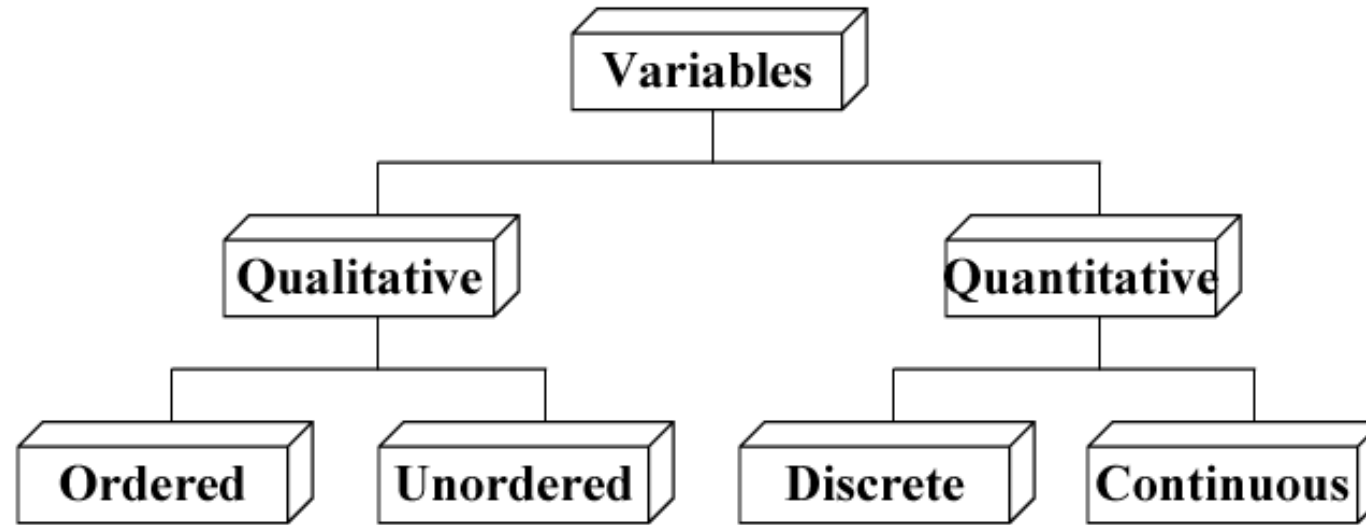
The Art of Data Presentation

Adapted by Prof. Gheith Abandah



- ❑ Types of Variables
- ❑ Guidelines for Preparing Good Charts
- ❑ Common Mistakes in Preparing Charts
- ❑ Pictorial Games
- ❑ Special Charts for Computer Performance
 - Gantt Charts
 - Kiviat Graphs

Types of Variables

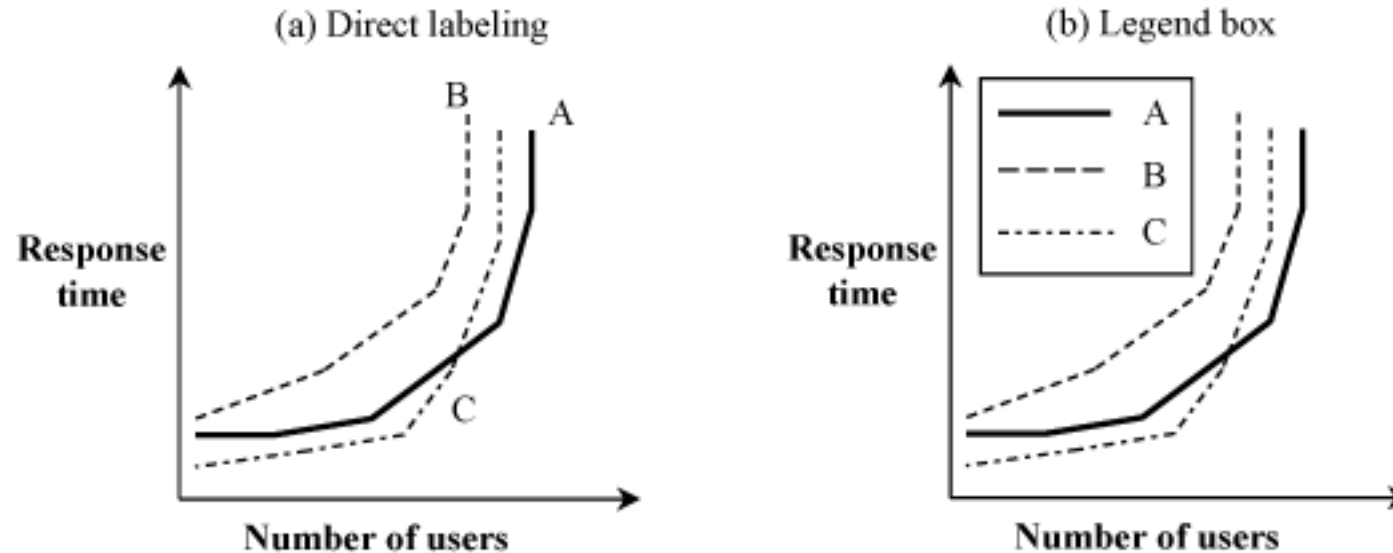


- ❑ Type of computer: Super computer, minicomputer, microcomputer
- ❑ Type of Workload: Scientific, engineering, educational
- ❑ Number of processors
- ❑ Response time of system

Guidelines for Preparing Good Charts

- Require minimum effort from the reader

Direct labeling vs. legend box

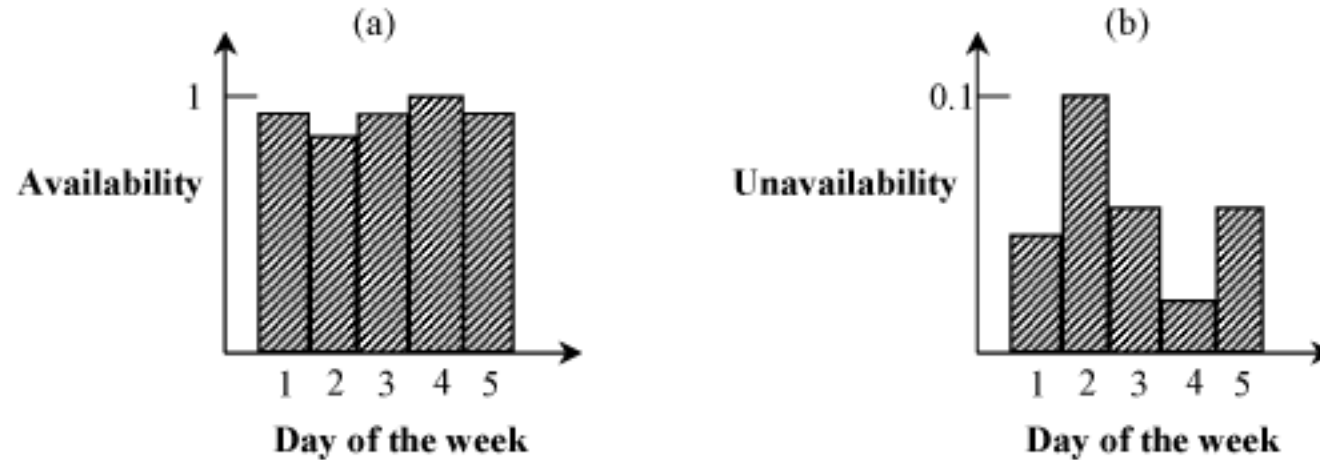


- Maximize Information: Words in place of symbols

Clearly label the axes

Guidelines (cont)

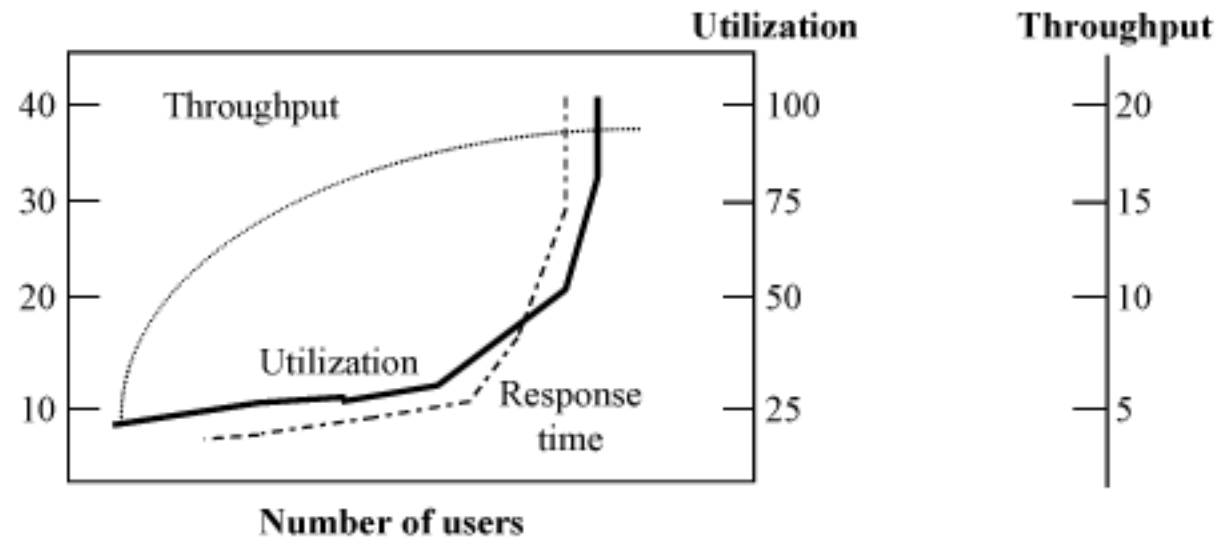
- ❑ Minimize Ink: No grid lines, more details



- ❑ Use Commonly accepted practices: origin at (0,0)
Independent variable (cause) along x axis, linear scales, increasing scales, equal divisions
- ❑ Avoid ambiguity: Show coordinate axes, scale divisions, origin. Identify individual curves and bars.

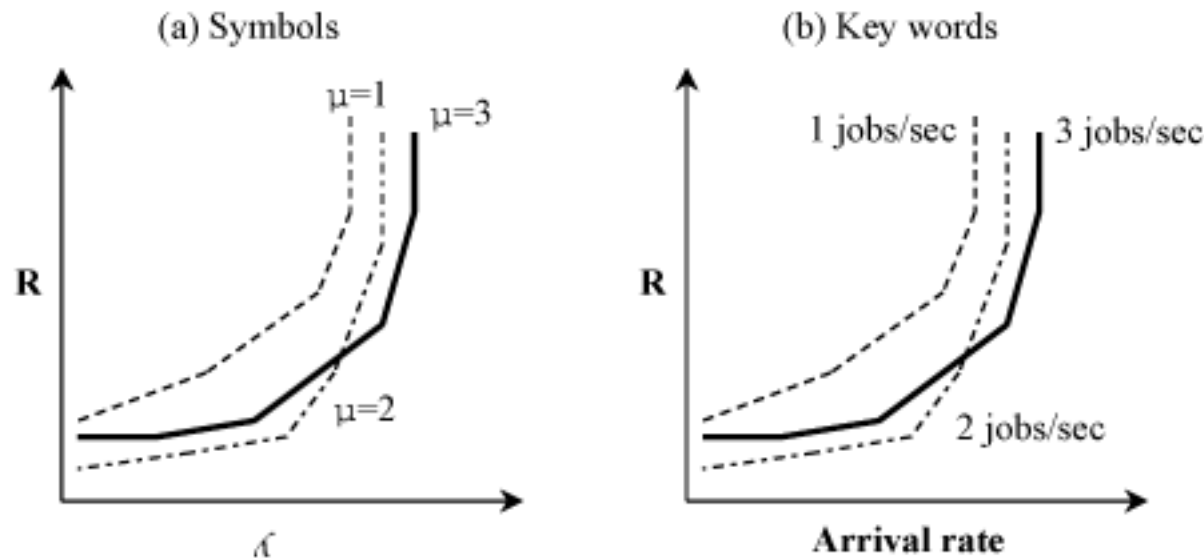
Common Mistakes in Preparing Charts

- ❑ Presenting too many alternatives on a single chart
Max 5 to 7 messages => Max 6 curves in a line charts, no more than 10 bars in a bar chart, max 8 components in a pie chart
- ❑ Presenting many y variables on a single chart



Common Mistakes in Charts (Cont)

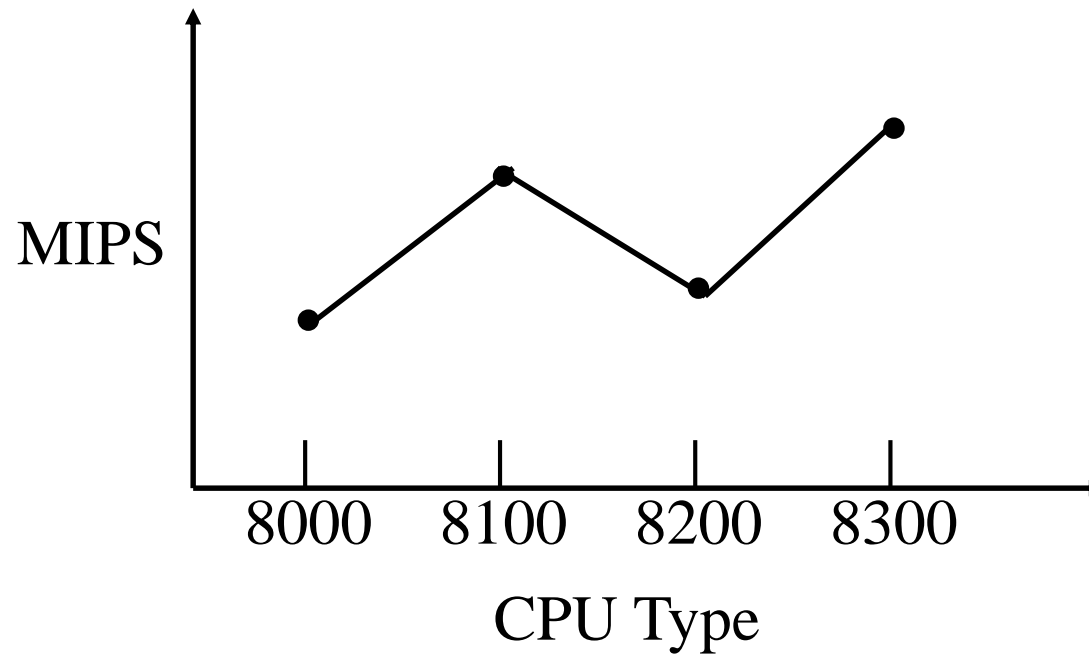
- ❑ Using symbols in place of text



- ❑ Placing extraneous information on the chart: grid lines, granularity of the grid lines
- ❑ Selecting scale ranges improperly: automatic selection by programs may not be appropriate

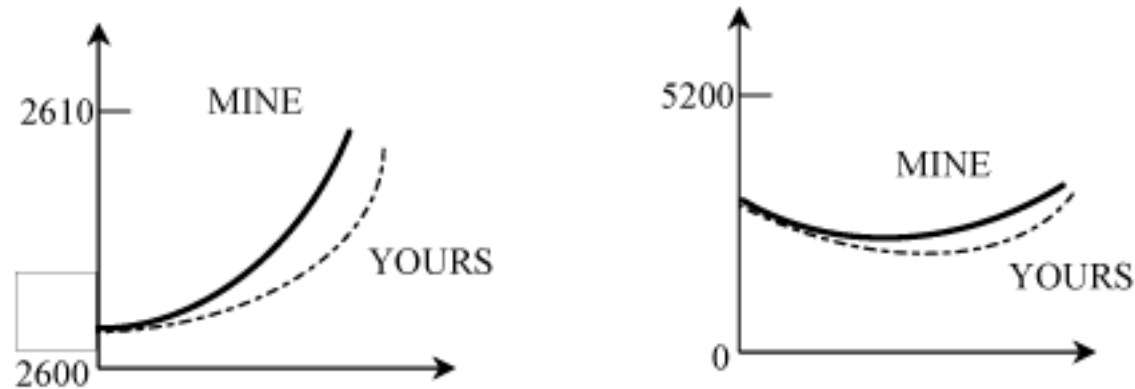
Common Mistakes in Charts (Cont)

- Using a line chart in place of column chart: line => Continuity

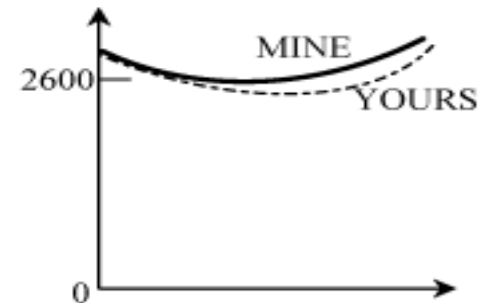


Pictorial Games

- Using non-zero origins to emphasize the difference

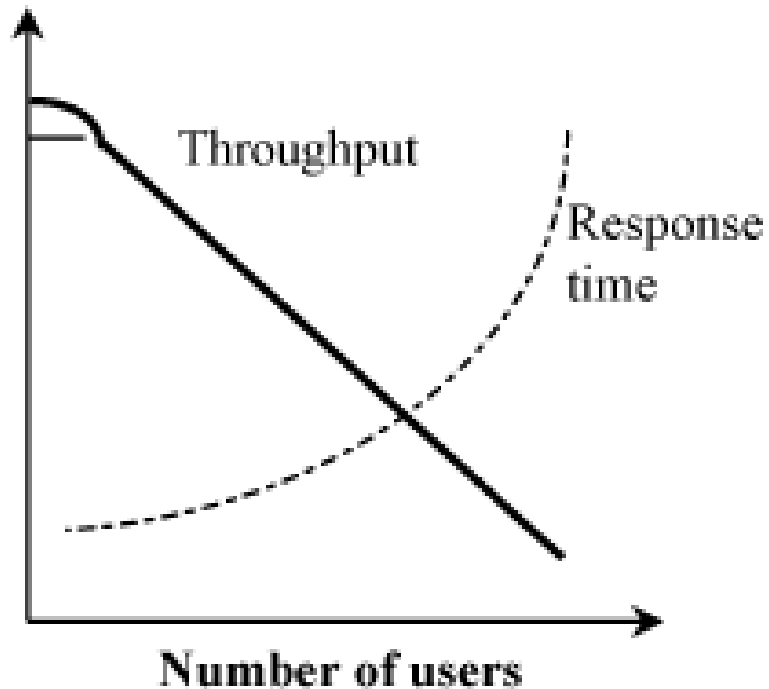


- Three quarter high-rule \Rightarrow height/width $> 3/4$



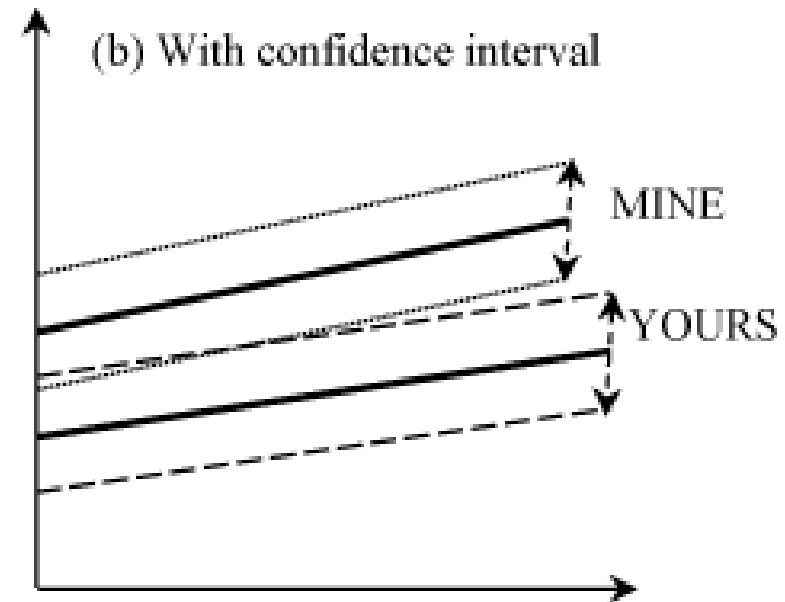
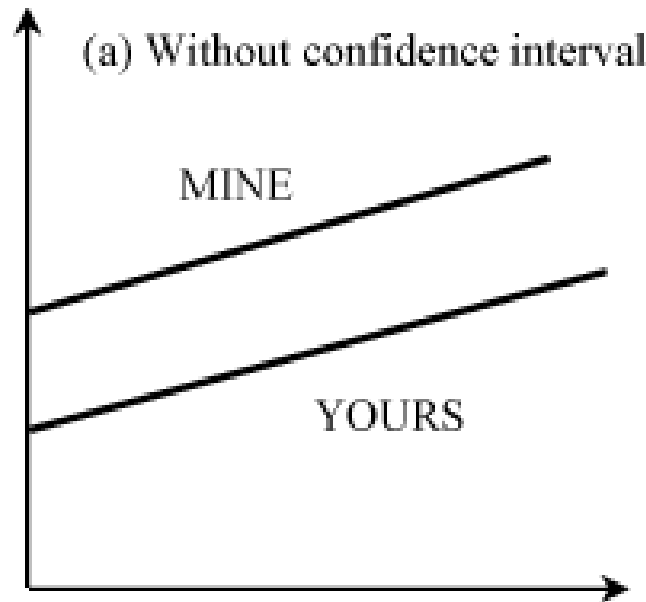
Pictorial Games (Cont)

- Using double-whammy graph for dramatization
Using related metrics



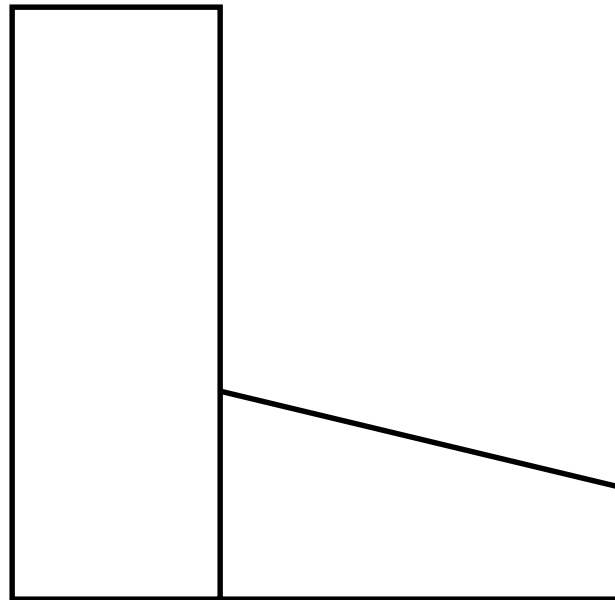
Pictorial Games (Cont)

- Plotting random quantities without showing confidence intervals

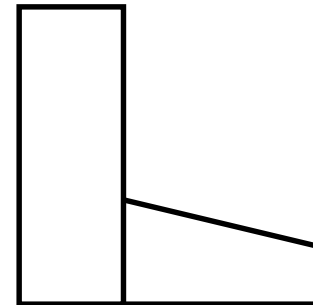


Pictorial Games (Cont)

- Pictograms scaled by height



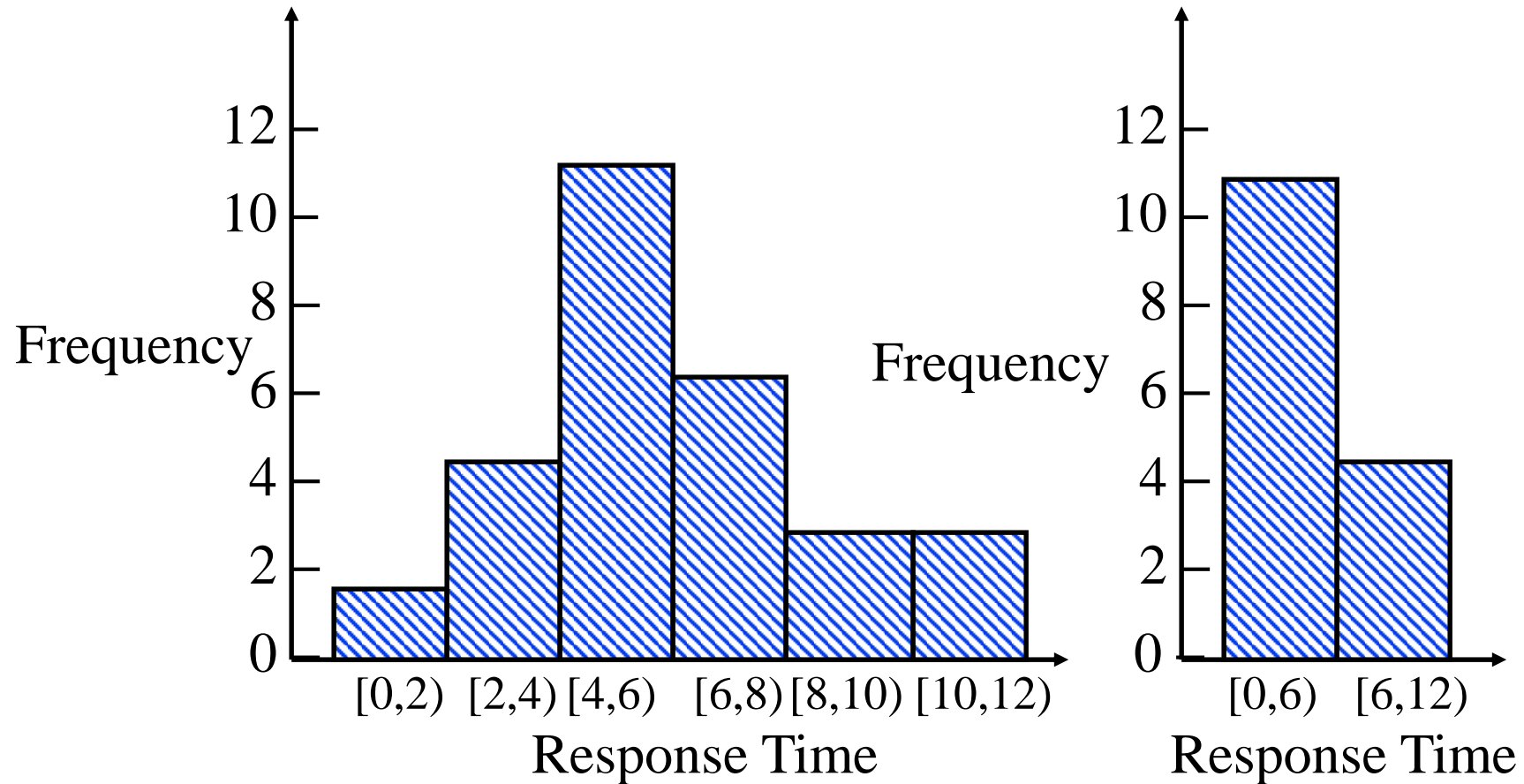
Mine
Performance = 2



Yours
Performance = 1

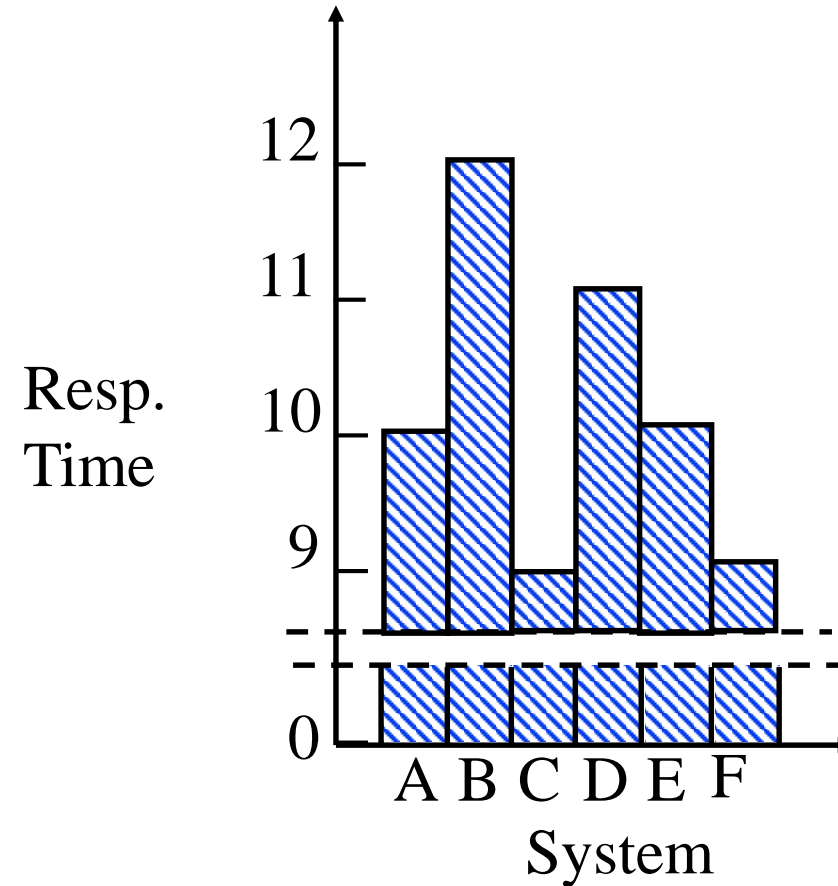
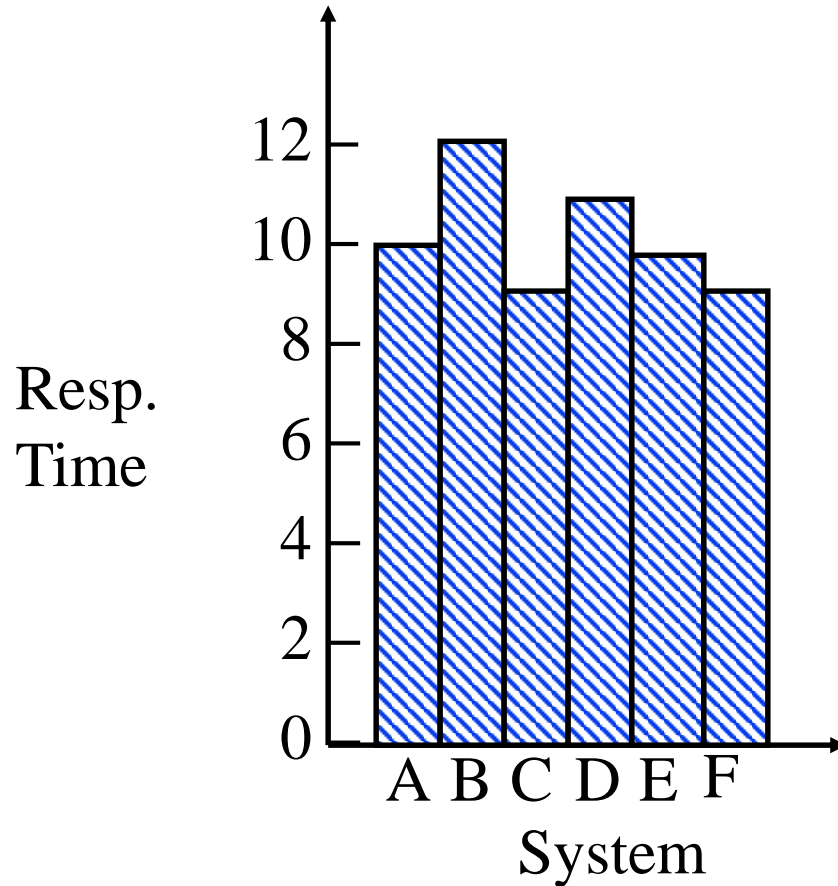
Pictorial Games (Cont)

- Using inappropriate cell size in histograms



Pictorial Games (Cont)

- Using broken scales in column charts

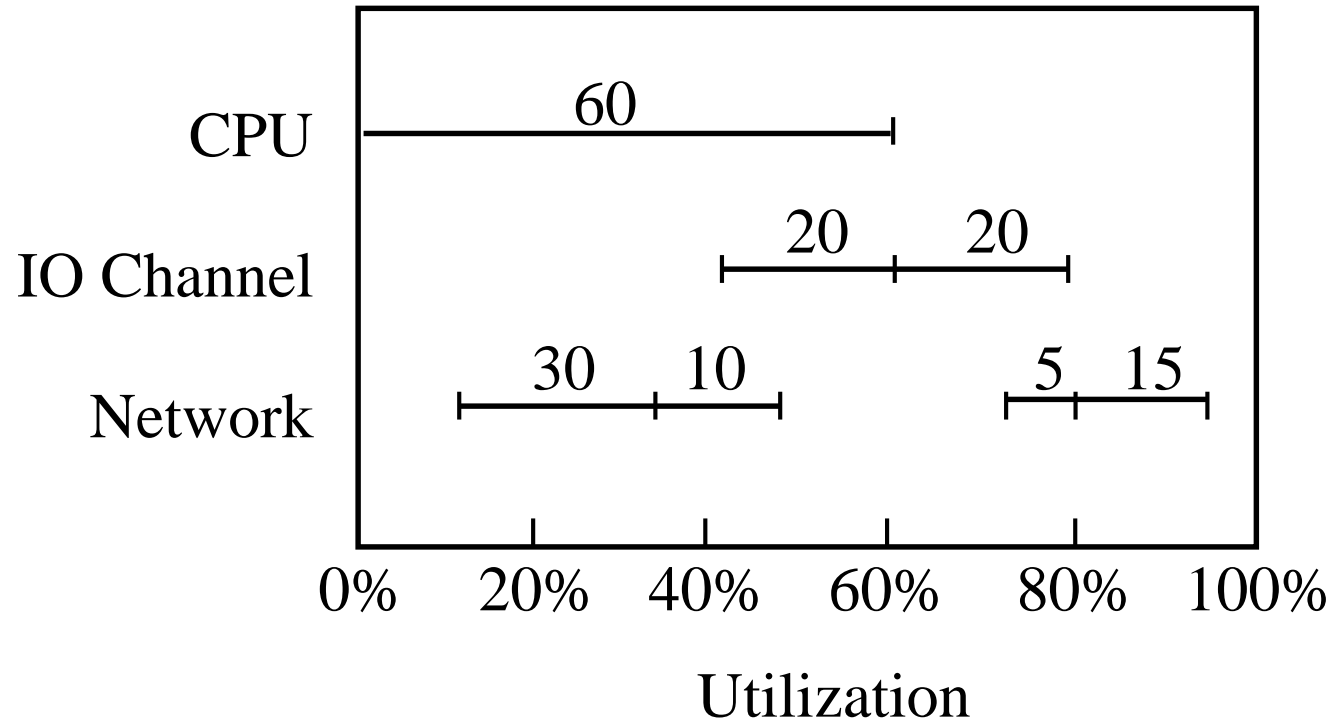


Special Charts for Computer Performance

- ❑ Gantt charts
- ❑ Kiviat Graphs

Gantt Charts

- Shows relative duration of a number of conditions



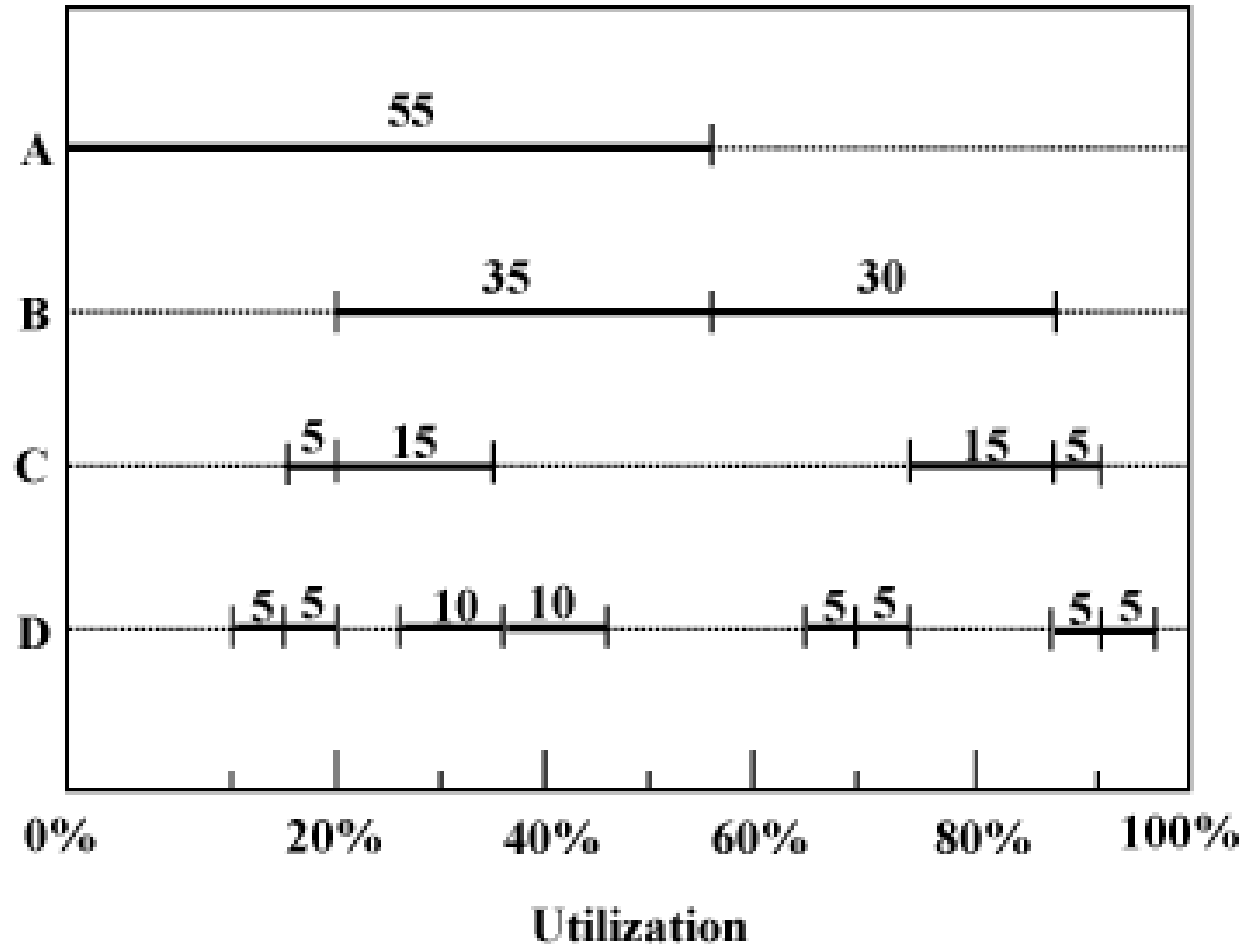
Example: Data for Gantt Chart

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	Time Used
0	0	0	0	5%
0	0	0	1	5%
0	0	1	0	0%
0	0	1	1	5%
0	1	0	0	10%
0	1	0	1	5%
0	1	1	0	10%
0	1	1	1	5%
1	0	0	0	10%
1	0	0	1	5%
1	0	1	0	0%
1	0	1	1	5%
1	1	0	0	10%
1	1	0	1	10%
1	1	1	0	5%
1	1	1	1	10%
Total				100%

Draft of the Gantt Chart

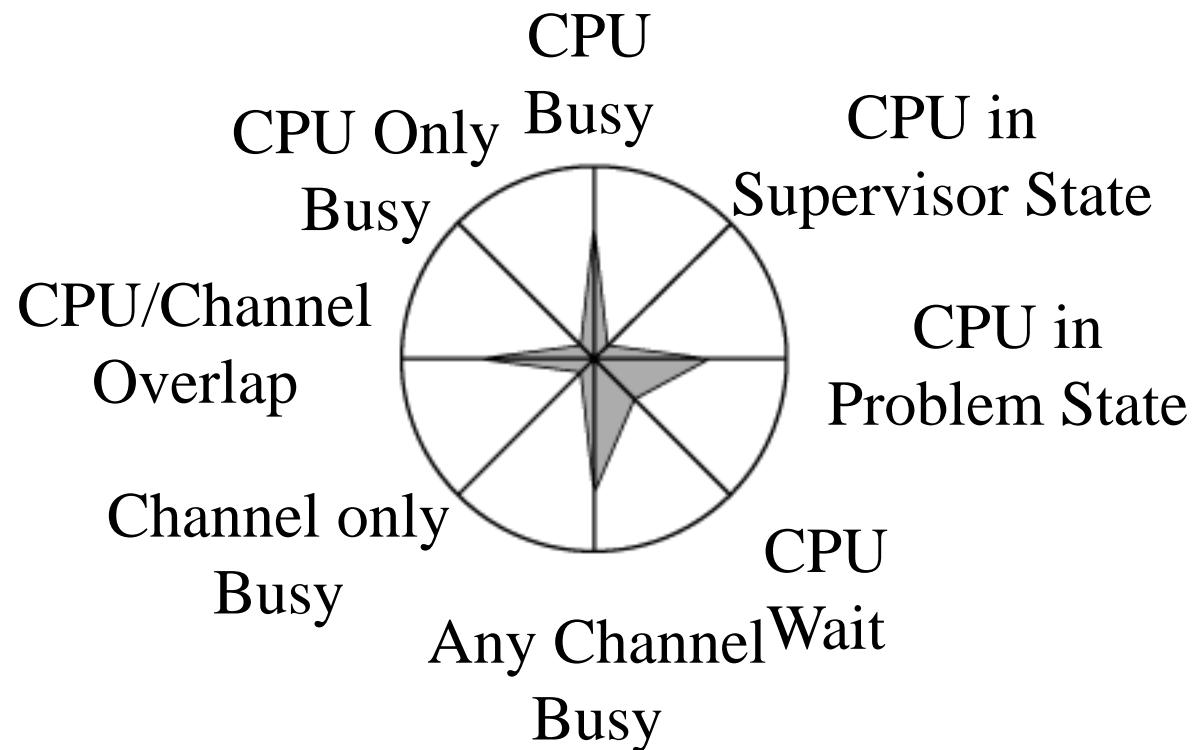
	A								\bar{A}															
A	55																45							
	\bar{B}				B								B				\bar{B}							
B	20				35								30				15							
	\bar{C}		C		C		\bar{C}		\bar{C}		C		C		\bar{C}									
C	15		5		15		20		15		15		5		10									
	\bar{D}	D	D	\bar{D}	\bar{D}	D	D	\bar{D}	\bar{D}	D	D	\bar{D}	\bar{D}	D	D	\bar{D}								
D	10	5	5	0	5	10	10	10	10	5	5	10	0	5	5	5								

Final Gantt Chart

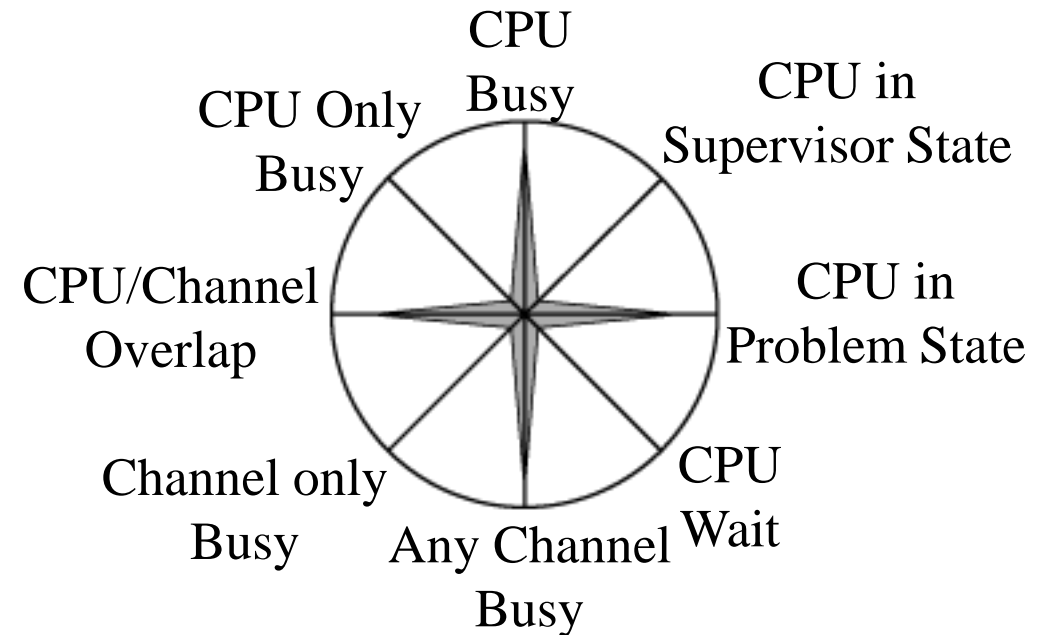


Kiviati Graphs

- ❑ Radial chart with even number of metrics
- ❑ HB and LB metrics alternate
- ❑ Ideal shape: star



Kiviat Graph for a Balanced System



□ **Problem:** Inter-related metrics

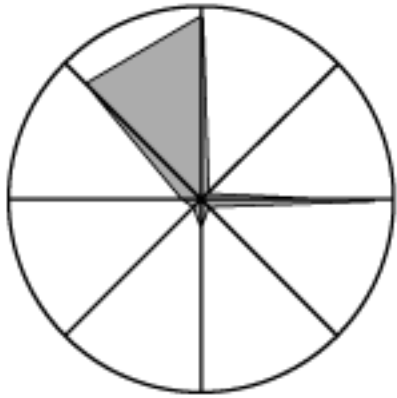
CPU busy = Problem state + Supervisor state

CPU wait = 100 – CPU busy

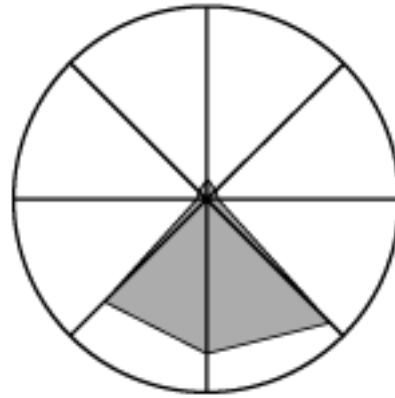
Channel only = any channel – CPU/channel overlap

CPU only = CPU busy – CPU/channel overlap

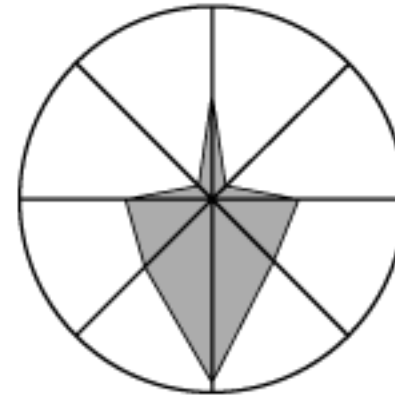
Shapes of Kiviat Graphs



CPU Keel boat



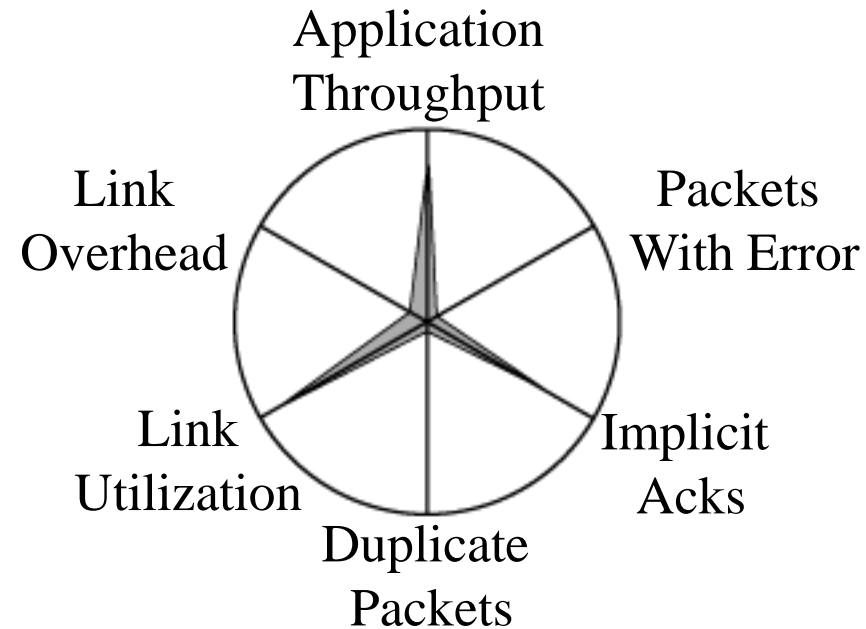
I/O Wedge

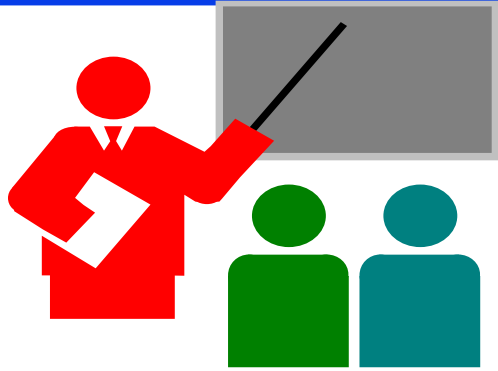


I/O Arrow

Kiviat Graphs For Other Systems

□ Networks:





Summary

1. Qualitative/quantitative, ordered/unordered, discrete/continuous variables
2. Good charts should require minimum effort from the reader and provide maximum information with minimum ink
3. Use no more than 5-6 curves, select ranges properly, Three-quarter high rule
4. Gantt Charts show utilizations of various components
5. Kiviat Graphs show HB and LB metrics alternatively on a circular graph
6. Workload, metrics, configuration, and details can always be challenged. Should be carefully selected.