

When To Use Pictures: Their Strength

- People have a powerful ability to recognize images that they have previously seen.
 - e.g., Standing et. al. (1970)¹ had over a 90% accuracy rate with test subjects recognizing whether or not they had previously seen an image (out of 2560 viewed over several days)

¹ Standing, L., Auto Numbering, I., and Haber, R.N. (1970) Perception and memory for pictures: single trial learning of 2560 visual stimuli. *Psychonomic Science* 19: 73 – 74). James Tam

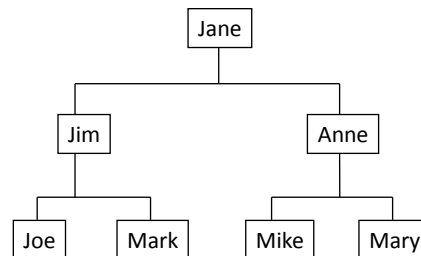
Pictures Vs. Words

- Pictures are better than text for showing structural relations.

Text

Jane is Jim's boss.
 Jim is Joe's boss.
 Anne works for Jane.
 Mark works for Jim
 Anne is Mary's boss.
 Anne is Mike's boss.

Structure diagram



Pictures Vs. Words (2)

- Generally images should when:
 - Structural information must be shown (links between entities or groups of entities).
 - A great deal of information needs to be remembered (images are more easily recalled than text)
 - Exception:
 - Abstract images: when the concept being represented is new and a direct visual representation is not common accepted and recognized).
- Generally text or the spoken language should be used when:
 - Abstract concepts must be portrayed e.g., freedom, efficiency.
 - The information is complex, procedural or non-spatial (it isn't related to something in the physical world).

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What Representation Should Be Used In A Spreadsheet?

- Text?
- A graph?
 - What type of graph? (Pie, bar, scatter etc.)

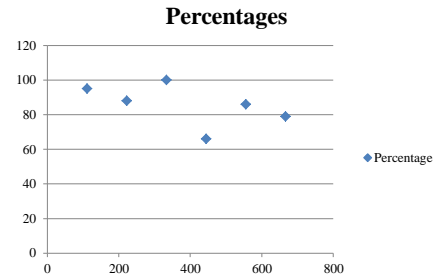
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The Benefits Of Using Text

- Text is the best representation to use when accuracy is paramount.
- Example term grades for individual students.

Student ID	Percentage
111	95
222	88
333	100
444	66
555	86
666	79

Vs.



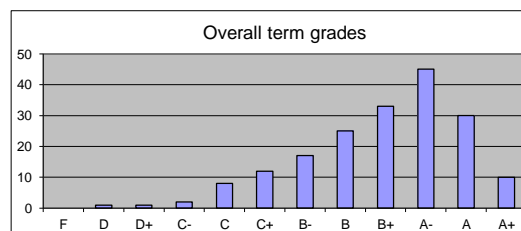
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The Benefit Of Using A Graph

- Graphical representations can make a powerful impression!

Letter	No. occurrences
F	0
D	1
D+	1
C-	2
C	8
C+	12
B-	17
B	25
B+	33
A-	45
A	30
A+	10

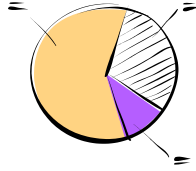
Vs.



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Ways Of Graphically Representing Information

- Pie chart



- Bar graph



- Line graph

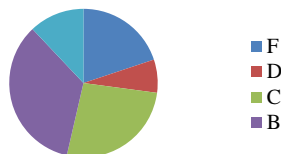


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Pie Charts

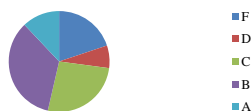
- Good for showing proportions, how much of the whole does each item contribute.

Grade distribution



- It's poor for showing exact numeric values.

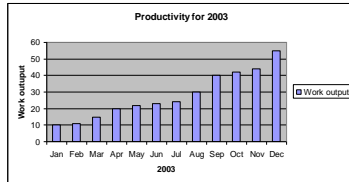
No. of students receiving each grade



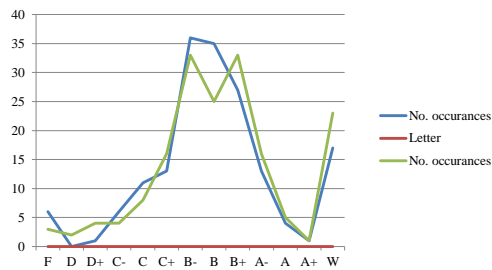
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Bar And Line Graphs

- For showing trends



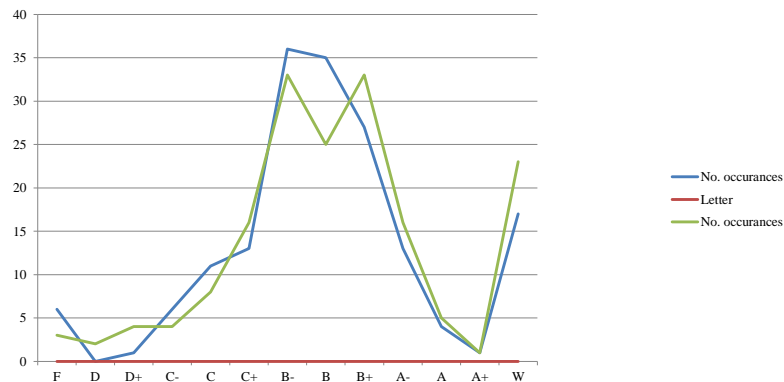
- Comparing functions



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Rules Of Thumb For Graphs

1. The X axis is used to plot known data (e.g., letter grades) while the Y axis is used to plot the unknown data (e.g., the number of students who received particular letter grades).



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Rules Of Thumb For Graphs (2)

2. Bar graphs are used to plot non-continuous data e.g., the number of patients that go to different hospitals.
3. Line graph are used to plot continuous data e.g., mortality trends over time.

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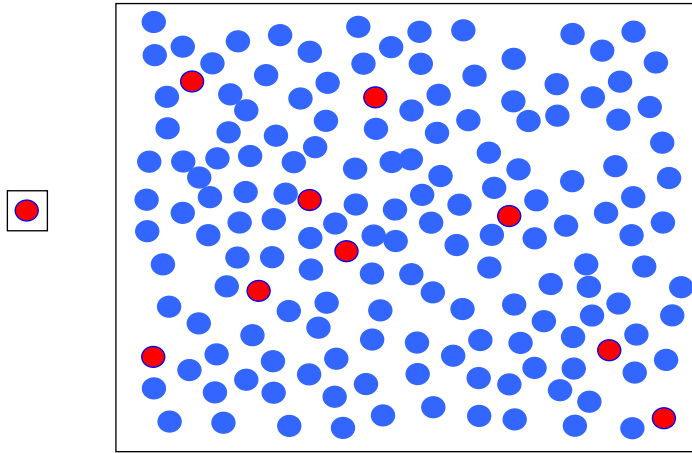
Use Color Sparingly

- Don't use color like did when you were a kid.

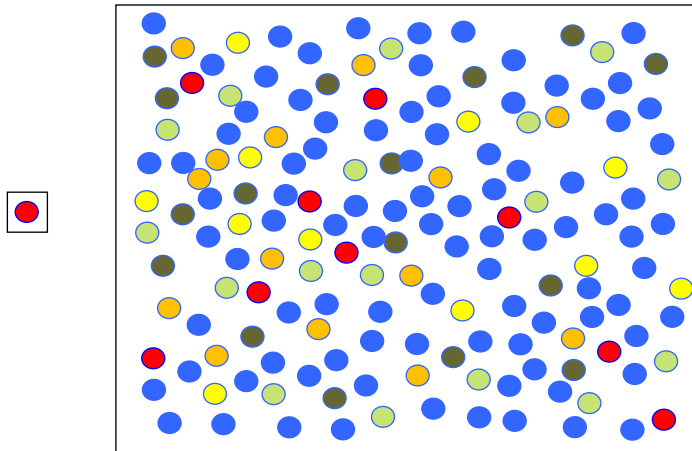


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Color Is Used Sparingly: Effective

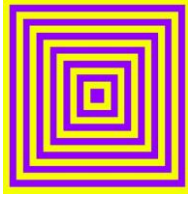


The Increased Use Of Color: Mutes The Message



Additional Issues Associated With Color

- Color blindness:
 - The majority of people who are color blind are red-green color blind so these colors should be avoided when communicating information.
- Rule of thumb: Keep it subtle
 - Avoid using ‘loud’ and/or clashing colors.
 - Taken to an extreme it may make your document difficult to view.



<http://farm2.static.flickr.com/>

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Additional Issues Associated With Color (2)

- Field size
 - The larger the area to be color coded, the more easily that colors can be distinguished

```
import java.applet.Applet;
import java.awt.Graphics;
import java.awt.Color;

public class ColorText extends Applet
{
    public void init ()
    {
        red = 100;
        green = 255;
        blue = 20;
    }

    public void paint (Graphics g)
    {
        Gr.setColor (new Color (red, green, blue));
        Gr.drawString ("Colored Text", 30,50);
    }

    private int red;
    private int green;
    private int blue;
}
```

- This means that if you use color for a large surface area you can use more muted/subtle colors. If you are using color for a small surface area then you need richer colors in order to make them stand out more.

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Additional Issues Associated With Color (2)

- When objects are small (text or small images) and color is used to distinguish information use highly saturated colors.

This is
important
information!

This is
important
information!

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