a2ps - A General Purpose PostScript Generating Utility

a2ps formats files for printing on a PostScript printer. It can also be described as a Any to PostScript filter. It processes plain text files, but also pretty prints quite a few popular languages. Its slogan is precisely "Do The Right Thing", which means that though it is highly configurable, everything was made so that a novice user can do complicated PostScript manipulations.

The default format used is usually just what you were looking for. Typically, this means two pages per physical page with borders, and some sort of header. symbol substitution etc.

Some examples:

Basic syntax:

```
  a2ps  options filename
```

To print a file 'doc.txt', just give it to a2ps: the default setting should be the one you'd like:

```
$ a2ps doc.txt
[doc.txt (plain): 9 pages on 5 sheets]
[Total: 9 pages on 5 sheets] sent to the default printer
```

a2ps sent the file 'doc.txt' to the default printer, writing two columns of text on a single face of the sheet. Indeed, by default a2ps uses the option '-2', standing for two virtual pages.

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Say you want to print the C file 'bar.c', and its header 'foo.h', on 4 virtual pages, and save it into the file 'foobar.ps'. You would type:

```
$ a2ps foo.h bar.c -4 -o foobar.ps
```

The option -4 tells a2ps to make four virtual pages: two rows by two columns. The option '-o foobar.ps' specifies the output file. Note too that the options may be specified before or after the files, it does not matter.

If you send 'foobar.ps' to the printer KEC3112, you'll discover that the keywords were highlighted, that the strings and comments have a different face. This is because a2ps is a pretty-printer: if it knows the (programming) language in which your file is written, it will try to make it look nice and clear on the paper.

```
$ a2ps foo.h bar.c -4 -P KEC3112
```

There are three special printers pre-defined. The first one, void, sends the output to the trash. Its main use is to see how many pages would have been used.

```
$ a2ps -P void myprogram.c
```

OR

```
$ a2ps -P display  myprogram.c
```

The second, display sends the output to Ghostview, so that you can check the output without printing. Of course if you don't have Ghostview installed, it won't work.

Figure 1: A voltage source water analogy.

In any case, electrostatic force actually moves the electrons. It is generally the result of having more electrons in one place than another. Since like charges repel, they all push against each other trying to find a path out of their cramped quarters. In a battery, the negative terminal has an excess of electrons and the positive terminal has a shortage of electrons.

Figure 2: Electron distribution

In passive devices, (ones that donł have an internal source of energy) electron flow is always from a location with an excess of electrons to a place with a relative shortage of electrons. In other words, current flows from an area of abundance to one of scarcity.

- Measuring voltage

Electrical potential, or *Voltage*, is measured in Volts. The unit is named after Alessandro Giuseppe Antonio Anastasio Volta who invented the first battery.

Voltage is not present hrough? anything like current. It is a measure of difference in electrical potential energy between two different wires or points in a circuit. It is only present between two non-identical points or wires.

- Specifying voltage between two points in a circuit

To accurately specify the voltage present between two points, three items of information must be known. **To specify a voltage requires knowing**:

1. The magnitude of the voltage
2. The reference terminal from which the voltage is measured
3. Two points in the circuit between which the voltage is measured

All the above information is commonly conveyed by placing a set of ?+? and ?-? signs directly adjacent to the points of interest with the magnitude of the voltage given by a numerical value. If a circuit *common* or *ground* is clearly evident, the magnitude is placed directly adjacent to the point of interest in the circuit with the reference being understood to be circuit ground or common. Sometimes an arrow is stretched between two points in a circuit to indicate the reference terminal and the measurement points. In this case, the head of the arrow is at the ?-? terminal and the tail of the arrow is at the ?-? end. See the examples in figure **??**.

Figure 3: Circuit Schematic

The ?+? or ?-? signs (if given) alone do not necessarily indicate the actual polarity of the voltage. The signs indicate the *reference voltage*. When coupled with the sign of the voltage magnitude, the actual positive terminal may be determined. See the example in figure **??**.

Figure 4: Circuit Voltages

To xchange? reference voltage signs, simply change the sign on the voltage magnitude. To change the sign on the magnitude, swap the voltage reference signs. Remember that the signs alone do not necessarily indicate the actual positive terminal.

Remember the difference between voltage and current measurements. Current is measured *through* something. Voltage is measured *across* two things.

Current is measured **through a single point** in a wire.

Voltage is measured **between two points**.

- Making voltage measurements with a digital multimeter

Since voltages are found across circuit elements, to make a voltage measurement with a meter, we must place the meter leads across the element in question. In the circuit below, the voltmeter is placed across the light bulb to measure the voltage across it.

Figure 5: Measuring voltage

When making measurements, the desire is to make the measurement without disturbing the original circuit. For an voltmeter to do this, its internal construction must look as if the voltmeter test leads connect to nothing inside the meter. The circuitry inside the voltmeter does present the equivalent of an infinite resistance. Thus, the meter is invisible to the circuit but can still measure the voltage between its leads.