Figure 1.5: WSU's DEC VAX 4500

Minicomputers were inexpensive compared to IBM mainframes (many minicomputers could be had for less than $500,000, while mainframes usually cost millions). Users of minicomputers would often use a terminal like a **VT100** (see a picture of the modern version of the VT100 (the DEC VT320) in figure 1.6). These terminals were also dumb terminals, as they were useless without the minicomputer. The minicomputers often had different programming languages available as well as lower costs, and they became quite common. The UNIX operating system was first programmed on a minicomputer (more about this later). The minicomputer was the first example in the trends of more availability and lower cost. All of the minis and mainframes were constantly improving their performance as well.

In the 1980s, **early networking** was founded on the minicomputer. Networking allowed the minicomputers to share resources and also allowed users of these machines to connect to other minis easily. Multitasking and multiuser capabilities were built into minicomputer operating systems as well.

Early modems also came into use around this time (the minicomputer era). The **modem** allowed the user to have a terminal at home (modem is short for modulator /demodulator). The user could take a dumb terminal home and hook it up to an external modem or acoustic coupler (see figure 1.7 for a modern external modem and figure 1.8 for an old acoustic coupler). The acoustic coupler did not have dialing hardware in it, and depended on the user to pre-dial the phone number of the remote system on the telephone. The user would then attach the handset of the telephone physically to the acoustic coupler. Acoustic couplers typically ran at 300 baud, while modern modems run at 56K rates. Most reasonably modern modems could connect to modular phone plugins directly and had built-in dialers. Once connected, the modem or acoustic coupler

Figure 1.6: A VAX Terminal (DEC VT320)

Figure 1.7: An WSU External Modem (a US Robotics Sportster) .

would take the data found on the serial port and turn it into a sequence of tones suitable for sending over the phone lines. Another modem attached to the minicomputer would receive the call and convert the data back into a form the minicomputer could use. Modems were essential to extending the reach of the minicomputer or mainframe into remote locations. If a user had a VT100 and a modem, they could do their work from at home. This is called **dialing in** and we still use our modems for this today (more on this later).

Important concepts: minicomputer, VT100, modem, VAX, multitasking, multiuser, networking, dialing-in