Orientation to Trades and Technology

A Curriculum Guide and Resource Book

with Special Emphasis on the Needs of Women

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Handout 1: You Already Know A Lot About Computers[22]

Whenever we are faced with a new type of machinery, or new technology, such as computers, the first reaction of most women is to panic — to view the new equipment as totally foreign and assume that any previous knowledge of other systems will not be relevant. While it is true that with each new system there are lots of new and different things to learn, often, methods of analysing a problem, and even solutions learned from previous systems and problems, can help speed up the learning process with a new system.

Let's look at the example of a computer. Computers are divided into two major parts, software (the instructions that control and operate a computer — that tell it what to do) and hardware (all the material aspects of the machine, its screen, keyboard, printer, and central processing unit).

Software

Software is usually made up of "programs" that do distinct tasks. Programs that manipulate text and drive a printer are called "word processors." Programs that allow the operator to enter financial information and produce accounts are called "spreadsheets," and programs that allow the operator to manipulate a large amount of facts and figures (called data) and develop relations and information about these items are called "database" programs.

So, you know nothing about computers and they are a mystery that in no way relates to anything else you've ever done! How about programming (the writing of instructions for a computer in order to make it do some function)? Well, if you've ever read and followed a recipe, then you have the fundamentals of computer programming!

A **computer program** consists of three parts: inputs, operations and procedures, and outputs; just as a **recipe** consists of three parts: a list of ingredients, instructions, and final product.

In recipes, the first thing you see is a list of ingredients. What you put into a product determines what comes out. Of course, if you are making something sweet and don't add a sweetener, you are not going to get a sweet end product. A computer program works the same way — often described by the unappetizing formula of "garbage in, garbage out." In both cases, your final product may seem a long way from the raw ingredients, but it is absolutely dependent upon them.

Next come the instructions — how to combine the ingredients and what to do to them. You know that if you don't follow these instructions, your final product will be messed up. For example, if you are baking a pie, you must make a pie crust. If, on the other hand, you decide to innovate and don't bother with the crust and simply bake the filling, you may have an acceptable product, but it's certainly not a pie, and is not what you set out to make! Similarly, the procedures in a computer program must be followed exactly; the order of the procedures, the exact locations and "ingredients" are all essential, or you may get an unexpected end product, or no end product at all.

In computers and recipes, there are distinct, repeatable methods for doing certain things — just as there are for making a pie crust. In computer programming these are called "subroutines." These subroutines can stand on their own, just as a pie crust recipe can regardless of the filling. In fact, once you've got a good pie crust recipe, you will stick to it. Similarly, complex programs can be developed from your own subroutines. Using subroutines helps you to analyse and troubleshoot problems, by isolating the problem spot. With a pie crust subroutine, you know it works

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22 "You Already Know A Lot About Computers" was written by Elaine Bernard, machinist, Director of Labour Studies, Simon Fraser University, and authority on Technological Change.

consistently, so if you add it to a new recipe, it will reduce the possibility of any problems arising.

The final step of a recipe or a computer program is the output or final product. Once you get to be an experienced cook, you can taste a final product, smell it, touch it, and analyse where you have gone wrong. Similarly, with a computer program, an experienced, analytical programmer can see where the problem is with a specific input statement (or a procedure) that is not quite right. It's as easy as apple pie.

Hardware

Let's look at an example of a computer, with a printer and a word-processing program. Carefully following the instructions in the manual, you try and start up (load) the word-processing program onto the computer. You will act like a cook, attempting to follow a recipe for the first time, so you cannot skip over steps, but have to read slowly and carefully. Don't worry, speed will come if you don't try and go too fast at the beginning.

But, suppose that nothing happens. Well, you do know something about computers — they run on electricity — and you certainly know something about electrical equipment, from toasters to drills. So, check: Is it plugged in? Is it turned on? Is there a separate plug and switch for the computer and the screen? Is the video display terminal (screen) turned on and plugged in? If you get no response from the system, it may indicate a power problem.

O.K., so now it's working; you see something on the screen and when you hit a key it echoes on the screen. Now, suppose you want to try and print something from the computer on the printer. Once again, nothing!

We know we've got to make sure everything is plugged in — but is there a wire (cable) going from the computer to the printer? There must be or how else can the information flow? Most printers (and this is explained in their manual) have a "self-test." This is a procedure that allows you to see if the printer (in isolation) works. Here's a key troubleshooting gem: check each major component in isolation. If the printer self-test works, then you know that the problem is not with the printer, but must be either with the computer hardware, computer software, or the cables connecting the computer to the printer.

Go back to the manuals. Analyse what should be happening. You are attempting to print a letter. Have you correctly typed the command "print"? Computers are fussy; if you make a typo, it will often completely ignore your instructions or tell you "bad command" (a most confusing statement). Try it again.

If it appears to take the command, but nothing happens, perhaps the text is not getting through to the printer. Check the printer cables. Are they plugged into the correct port, both in the computer and the printer?

A good method of troubleshooting is analysing the functions into distinct steps, and finding the block — the location where things that should be happening are not. This does not necessarily mean that this is the trouble spot, but it should allow you to follow the process back until you can identify the problem. Why troubleshoot yourself? Why not simply ask someone else? Well, eventually you may have to, but, by first analysing the problem yourself, you may be able to correct the error. At the very least, you will be able to speed up the correction process by giving a clearer description of the problem to the person who comes to help you.