a computer in your vegetable garden

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A unique program in vegetable gardening has been developed by Purdue University specialists in horticulture and computer technology. This computer program offers residents of Indiana individual garden plans based on their own specifications.

It's all a part of the new FACTS computer system that offers computer assistance in a wide variety of programs such as food preservation, fabric stain removal, livestock rations, 4-H projects, and home insulation. FACTS, which stands for Fast Agricultural Communications Terminal System, began with an initial $1.2 million grant in 1977 from the W. K. Kellogg Foundation along with additional state and federal funds. It's now the model for Extension Services as well as commercial enterprises in the United States.

The System

The FACTS system consists of a computer terminal in each of 92 county Extension offices and in nearly all agricultural and consumer and family sciences (home economics) departmental offices at Purdue. FACTS is unique in that the program is run at the county office. In this system, county and departmental terminals are "intelligent," meaning they have the capability to do more than just transmit and receive data. For example, each terminal is in itself a small computer and has individual local information processing ability.

Digital Equipment Corporation, Maynard, Massachusetts, manufactured the terminals. Each consists of a central processing unit (CPU), which houses the memory and processor; disc drives,

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a screen, and keyboard; and a printer. Programs and data are stored on flat, thin, flexible oxide-coated disks similar in size to a 45-rpm phonograph record. Each floppy disk is capable of storing 250,000 characters in random access fashion. MU-BASIC is the software used. MU or multiuser refers to the fact that up to eight video terminals may be used with one CPU.

Gardening on the Run

During the 1970s, the Gallup organization surveyed households for interest in vegetable gardening. The survey showed that from 1971 to 1975, interest in vegetable gardening increased steadily to a peak in 1975 of 49% of the households gardening. In 1980, the number was 43%, but gardens were larger and a greater variety of vegetables was being grown. Because of the interest in vegetable gardens, specialists at Purdue developed a garden program to help take the pain out of garden planning.

First, specialists envisioned this program would be of most help to beginning gardeners, since they would know least about planning and layout. Since the program was introduced, "long-time" gardeners have taken great delight in challenging the computer "and those little men who run around inside it."

The uniqueness of the program, as well as its reliability, can be related by the following letter. "One warm day last spring, my wife and I planted our vegetable garden. The next day I went to the county Extension office and decided to see how much differently the computer would plan my garden. Lo and behold, the computer planned my garden exactly as I had planted it. It made me wonder if all my jobs would eventually be taken over by a computer."

How It Works

Input

To obtain a garden plan, the operator (an Extension agent, secretary, or office aide) simply places the appropriate discs into the machine and, after a short warming-up period, the computer is ready "to fire questions at you."

The screen of the terminal above the keyboard lights up and begins asking a set of predetermined questions. All you have to do is type in the answers. In fact, you don't really need to know how to type—you can use the one finger technique.

First, it asks your name. After you've typed in your name, you hit the return key and the next question appears. Then, you enter the size of your garden plot in feet. The program plans gardens as small as 1' x 1' or as large as 900' x 900'.

Your next decision involves selecting one out of a series of six possible garden shapes that most nearly approximates your garden plot in shape and orientation to the sun. You need to tell the computer this information so it knows which direction in your garden is north. Later it uses this information to properly place the crops so the tall ones don't shade the shorter ones. As your garden is planned, the computer makes sure that your sweet corn is block planted so that you'll have adequate pollination.

Your next decision entails telling the computer how you intend to cultivate your garden. If you plan to use a rototiller, you may want all rows spaced three feet apart, but if you're a small plot gardener and prefer hoeing, you'll indicate a row spacing of one foot. However, the computer has already been programmed to place spreading crops such as cucumbers and melons on four-foot row spacings.

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Now comes the choice of the vegetables you wish to grow. You'll be asked to enter the number of adults for whom you wish to grow vegetables, for both fresh and processed use. For example, the first vegetable on the list is green beans. If you have 3 adults in your family, and all eat large amounts of fresh green beans, then you'd enter 3. However, if dad is the only 1 who eats them frozen, you'd indicate 1 for the processed category.

The vegetable list also gives you an idea of the amount 1 adult will eat for each category—1 adult usually eats 9 lbs. of fresh green beans and 18 lbs. if processed. The internal programming contains all types of statistics as to how many plants (or feet of row) are needed to produce the average quantity one person can consume. If you have children, you'll need to list their needs based on an adult portion.

You proceed through a list of 27 different vegetables. Included are such crops as lima beans, summer and winter squash, broccoli, eggplant, okra, peas, and swiss chard. Also, you must choose whether to grow tomatoes caged, staked, or nonstaked.

Output

When you've completed the list, you can sit back and listen to the humming and clicking sounds as the computer plans your garden. First, it decides if your garden is large enough to grow sweet corn and vine crops that require large areas.

It next decides if the area is large enough to grow *all* the vegetables in the amounts you've asked. If your plot isn't large enough, it'll reduce all the vegetables you selected proportionally. In fact, after you've seen the printout, you may want to rerun the program and adjust some of your input figures.

In a few minutes, your eight-page paper printout appears. First, you obtain a summary of all the information you gave the computer. That's a double check to make sure you told the computer everything correctly.

The second sheet summarizes the amount of each vegetable you can plant. It tells the number of people each vegetable will feed. This information is particularly important if the vegetable requirements have to be reduced.

And now comes the plan! Right before you, your garden is laid out (see Figure 1). Each vegetable is indicated by specifically spaced plants for such crops as tomatoes, cabbages, and melons. All row crops are indicated and spaced accordingly. The plan tells you exactly how many plants you need, how far apart each row should be, how far apart each plant should be from each other, and exactly where each crop should be planted in the plot for best growth. This plan is designed so you can take it right into the garden with you to use as your handy planting guide.

Following the plan is a summary of the number of plants, hills, or feet of row of each vegetable you'll be planting in each row of your computer garden. It also gives you a key to the vegetable symbols just in case you can't tell the difference between a cauliflower and a cabbage plant.

Next follows a chart that tells you how, when, how deep, and how far apart to plant each vegetable. The chart also gives you specific planting dates for each crop and tells you which crops should be successively planted for more efficient garden space use.

For novice gardeners, a brief explanation is given for such terms as drilling, hilling, and successive planting. The explanation also describes which crops can be planted in fall gardens.

Then, just for added interest, some brief cultural notes for each individual vegetable crop are included. For example, it tells you that "radishes grow best in cool weather. Supply adequate water for quick, steady growth. Lack of water causes hot flavor and woody texture."

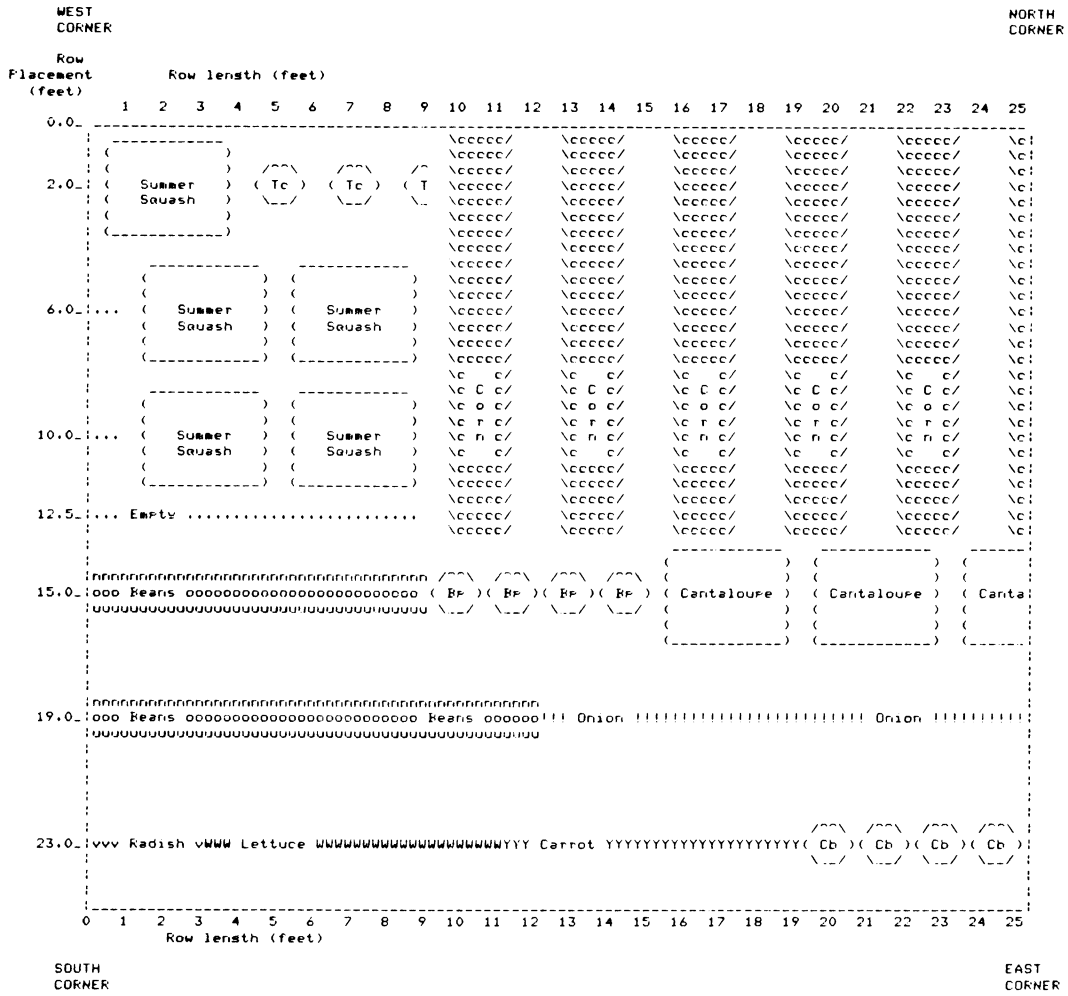

Figure 1. A garden plan for a 25' x 25' garden.

To conclude your wealth of gardening information, there's a list of 10 good gardening rules. With this, the printer stops, and you have your computer planned garden.

How It Has Been Used

The program was tested in selected Indiana counties during 1978 and 1979. Since 1980, the program has been available to all Indiana residents, free of charge, simply by stopping at or calling the county Cooperative Extension office. Estimates indicate that annually 15,000 gardens were planned in 1980 and 1981. At just a single flower show, 1,000 requests were received.

User surveys have indicated that 16% were beginning gardeners, while the balance had some vegetable gardening

experience. They indicated the plan was especially helpful in determining the amount to plant and correct row placement for efficient use of space and ease of cultivation. Several advanced gardeners have written to indicate "I always suspected I was planting too much and this (printout) just confirms it." Gardeners who used the plan have returned to have their garden planned during successive years.

The program was copyrighted by The Purdue Research Foundation and has since been released to the Northrup King Co., Minneapolis, Minnesota. They have adapted it for use throughout the United States, after regionalizing the recommendations.

Summary

Vegetable gardening has moved into the computer age. And Cooperative Extension efforts in computer programs are growing also. Increasing numbers of county offices now have access to computers and it's only a matter of time until everyone will have access to even more sophisticated programs and hardware.