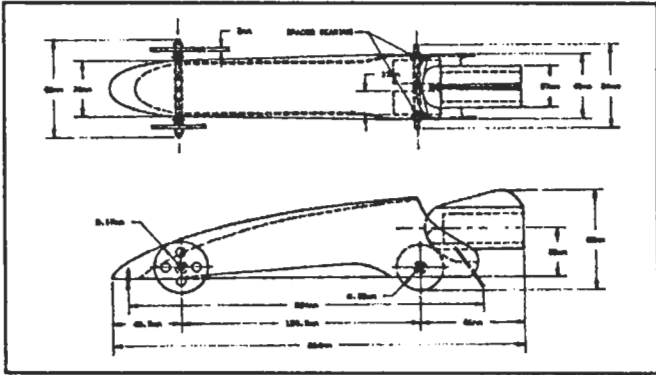


Designing a Metric Race Car Using AutoSketch®

Introduction

Computer Assisted Drafting (CAD) is the leading edge **technology** in the field of Drafting and Design. Today you will begin your first steps into this exciting world.



CAD Drawing of a Metric Race Car

You have already been introduced to the world of drafting as a technical language. In previous activities, you used drafting tools to create drawings that communicated technical information. However, draftspersons today have new technologies available that can be used to make their job more efficient. The Computer Aided Drafting System uses a computer **program** to create the same kinds of drawings that you have done on the drawing board. CAD is a more efficient way to produce drawings for several reasons. Since the computer can store information and retrieve it in an instant, the draftsperson has access to thousands of objects, lines, and symbols stored in the computer's memory.

Remember when you needed to draw an object more than once? For instance, if you needed a symbol several times in a drawing,

you had to manually draw it each time. With a CAD program, symbols stored in memory can be added to a drawing with a few strokes of the keyboard or the click of a mouse button.

Changes to drawings, called **editing**, are done on the computer screen quickly and stored in the computer's memory. The changes can be saved in a separate file in the computer's memory, along with the original drawing without the changes. Previously when you made a mistake on your drawing, you had to erase and then redraw the object. With a CAD program, corrections can easily be made with a few keystrokes.

Retrieval is also easier. Once a drawing has been stored in the computer's memory, an output device called a **plotter** is used. The plotter will draw in a matter of several minutes a very complicated drawing that would take several hours to create on the drawing board.

Job Description

In this activity package you are going to make a drawing of a race car using a Computer Assisted Drafting (CAD) program called AutoSketch®. The local organizers of the Youth Fair have asked your school to develop a new and exciting design to be entered in the next Research and Design competition. The Youth Fair wants to use your design and CAD drawing in its advertising campaign to promote upcoming competition.

Before you begin your CAD drawing, you will learn the purpose of the AutoSketch **pull-down menus** and some of the **commands** found in the **Draw, Assist,** and **File** menus.

Supplies and Materials

To complete this activity, you will need the following materials and supplies:

AutoSketch® Software
Formatted Data Disk

Procedure

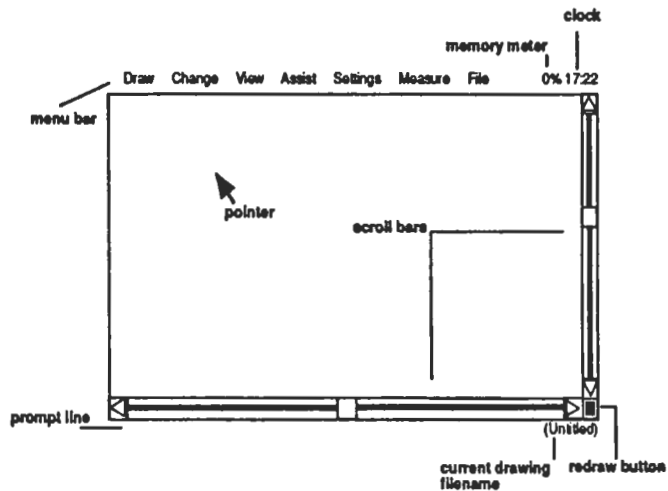


Figure 1 - Drawing Screen

1. Load AutoSketch as directed by your teacher and you will find yourself in the Drawing Screen. (See Figure 1.) As you move your pointing device around, you will see the **arrow pointer** move around the screen.

2. Insert the data disk that your teacher gave you into drive A and close the door.

3. Move the arrow pointer to the menu named **File**. When the arrow is pointing to a name in the **menu bar**, that menu name is highlighted. When a menu name is highlighted, pressing the button on your pointing device causes the highlighted menu to roll down onto the screen.

Note: Throughout this activity, we will refer to this button on your pointing device as the **PICK** button or just **pick**.

4. Move the arrow pointer to the menu named **File**. (See Figure 2.) Press the pick button and the menu will roll down. Move the arrow pointer up and down within the menu. When-

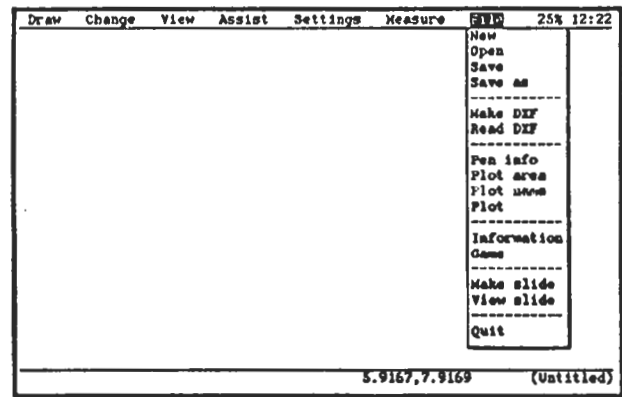


Figure 2 - File Menu Bar

ever the pointer is on top of a menu item, that item is highlighted. Move the arrow onto the **Open** command and pick it.

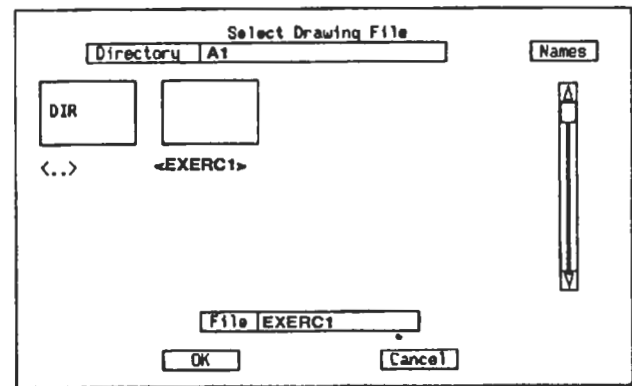


Figure 3 - EXERC1

5. Move the arrow onto the box above the word **EXERC1** and pick it. The word **EXERC1** will appear in the box next to the word **File**. (See Figure 3.) Move the arrow onto the word **OK** and pick it. This process will load a practice drawing called **EXERC1** onto the drawing screen. (See Figure 4.)

6. Move the arrow onto the **Draw** menu and pick it. The draw menu will roll down onto the screen as shown in Figure 5.

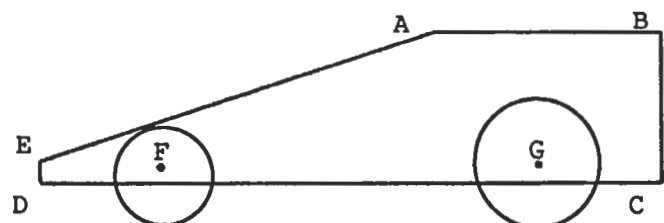


Figure 4 - EXERC1

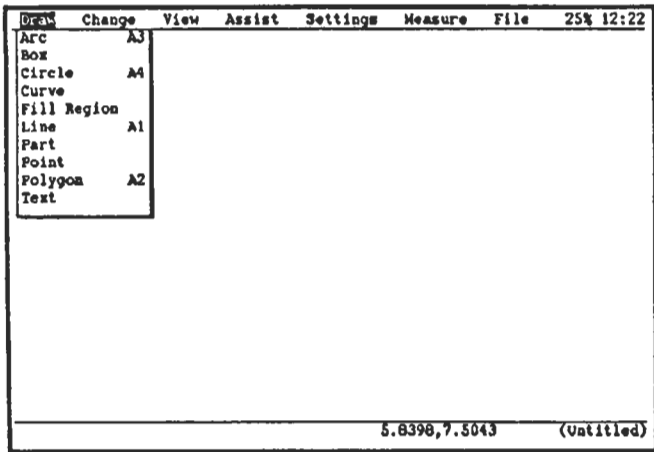


Figure 5 - Draw Menu Bar

7. Move the arrow down the Draw menu and highlight and pick the command **Line**. Draw a line beginning at point A to point B. Draw over the top of the red line. Remember the lines are our friends.

8. Continue to draw lines from point B to point C; from point C to point D; and from point D to point E.

Note: If you make a mistake, move the arrow to the **Change** menu and pick it. (See Figure 6.) When the menu rolls down, move the arrow to **Erase** and pick it. The cursor will become a finger with which you can point at objects in the drawing. You can now move the finger onto the line you want to erase and pick it. After you erase, you will need to redraw from the **View** menu. (See Figure 7.)

9. Before you go any further, let's save what you have done so far. Move the arrow pointer

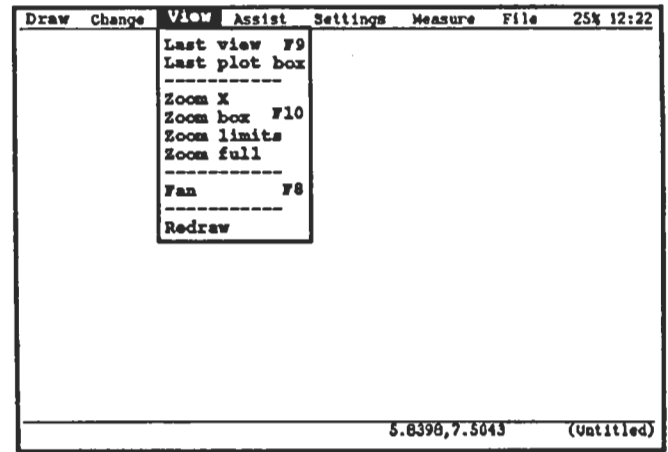


Figure 7 - View Menu

onto the **File** menu and pick it. When the menu rolls down, move the arrow pointer down and highlight the **Save As** command and pick it. After you pick the command, a **dialog screen** like the one in Figure 8 will appear on the screen. Move the arrow pointer onto the letter E in the word EXERC1 and pick it. After you have deleted the file name, type your first name; then move the arrow pointer along the same line and pick OK. Now move the arrow pointer to the box named OK and pick it. You have saved your work in a file with your first name as its title.

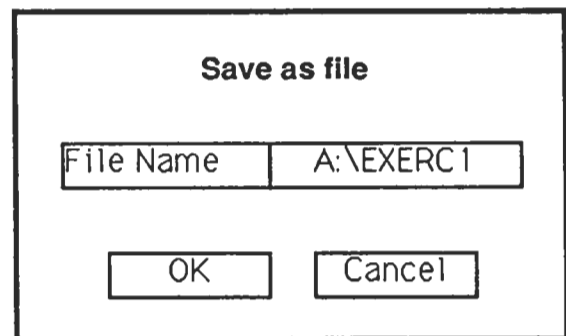


Figure 8 - Dialog Screen

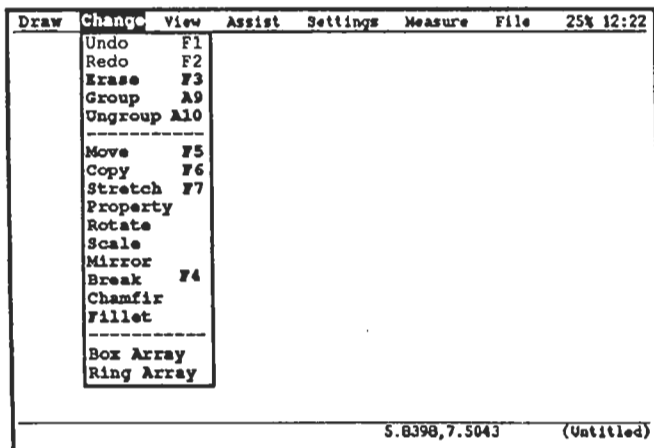


Figure 6 - Change Menu

10. Now you are ready to draw the curve from point E to point A. Move the arrow pointer to the Draw menu, highlight it, and pick. When the menu rolls down, move the arrow to the **Arc** command and pick. Begin to draw the arc by picking point E; next pick a point halfway between point E and point A; lastly pick point A to complete the arc.

11. The last part of the car that you will draw are the tires. Move the arrow pointer onto the **Draw menu** and pick it. When the menu rolls

down onto the screen, move the arrow pointer to the command **Circle** and pick it. The computer asks you where you want the center of the circle. Move the arrow pointer to point F and pick it. Next drag the circle to the proper size and pick. Remember to stay within the lines. Repeat the process to draw the circle at point G.

12. Now it's your turn. In the space below the race car you have just finished, draw one of your own design. Try to be neat and accurate, and make all your lines straight and connecting.

13. At the end of the drawing session, you must save your work and quit the program. Move the arrow pointer to the file menu and pick it. Next, move the arrow pointer down and highlight the **Save As** command and pick it. A dialog box will appear on the screen. Your first name will be in the box next to the word File name; move the arrow pointer to OK and pick it.

14. To quit the program, move the arrow pointer to the File menu and pick it. Next, move the pointer down and highlight the **Quit** command and pick it. After you quit the program, you may take out your data disk and turn off the computer as directed by your teacher.

Vocabulary

computer	program	Commands:
CAD	retrieval	Line
mouse	editing	Open
monitor	disk	Circle
boot up	backups	Arc
arrow pointer		Save as
pick button		Quit

Ecology

In your classroom you should have a designated area to recycle computer paper. Remember to conserve energy; turn off the computer when not in use.

Care of Computers


Do not bring food or sodas near the computer. Protect disks from exposure to magnetism and from extreme heat or moisture. You should not bend disks or touch exposed portions. Also, it's a good idea to make frequent backups in case your original disk is destroyed.

Safety

Avoid turning the computer on and off too quickly. Allow the hard drive to come to a complete stop before turning the computer back on. To avoid electrical shock, do not touch exposed wires.

On Your Own

1. Place text on your drawing using the **Text** command. Locate the beginning of text with the cursor and then type your text on the keyboard.
2. Using a computer magazine like *PC* or *BYTE*, research computer programs that will create CAD drawings. Find out what different capabilities each of the programs have. What can they do that is special?
3. Use a computer magazine to find examples of drawings done on CAD programs. Mount the examples and label the type of program the work was done on. Use these examples to create a bulletin board or display for your laboratory.
4. Make a hard copy of your drawing using the plot command located in the **File** submenu.



Office of Vocational, Adult, Career,
and Community Education
Technology Education
Dade County Public Schools
Miami, Florida

TEACHER GUIDE

DESIGNING A METRIC RACE CAR USING AUTOSKETCH®

Objectives: Upon completion of this assignment, the student will be able to:

- Open an Autosketch® File.
- Use the commands in the Draw, Assist, and File Submenus.
- Complete a simple CAD drawing.
- Edit an existing drawing.
- Save a drawing.

Helpful Hints:

1. In many instances you will not want your students to be able to access files on your hard drive. Also, you may not want students to save their work onto the hard drive. Included on the practice disk is a batch file (run.bat) that, when installed, will require using a floppy disk on which your students' work will be saved. The batch file will run the Autosketch® program from a floppy drive rather than from the hard drive. The name of the batch file is run.
2. To use the batch file you must first load the batch file onto the directory where you have loaded the Autosketch® files. Normally this directory is called Sketch3 if you have installed Autosketch® as directed in the installation guide provided with the program diskette. After you have booted up the computer, get into the Autosketch® directory and copy the batch file (copy A:run.bat) onto your hard drive.
3. When you are ready to begin an Autosketch® activity, boot up the computer; log into the directory where the Autosketch® program resides (Sketch3); insert a copy of the Activity diskette into drive A:; type the word run; and hit the enter key.
4. It is suggested that you make several copies of the activities diskette. Keep the original in a safe place and use only the copies. You might consider giving each student his or her own disk.
5. If you are using a Logitech® or PC mouse, you must first load the software that came with the mouse before you can run Autosketch®. If you plan to use the batch file run, you must first load those mouse files onto the same directory where the Autosketch® program resides.

MATH APPLICATION DESIGNING A METRIC RACE CAR USING AUTOSKETCH®

_____ Student Name

In all types of jobs and occupations you will need the ability to apply mathematics effectively. The following exercise will help prepare you for the challenging world of automotive design.

The metric system of weights and measures is used throughout the world. While the United States still uses the English system of pounds and inches, many American industries are using the metric system in their research and design departments in an effort to compete internationally.

Metric measurements are based on the decimal system. This makes measuring with a metric scale relatively easy because there are no fractions. A metric scale is marked off by millimeters and centimeters. The short lines on the scale represents millimeters. The longer lines are the centimeter marks (10 millimeters = 1 centimeter).

When measuring a distance with a metric scale, always place the zero at the starting point and read the measurement at the end point.

Try these: Measure the lines and record your answers.

Measure to the nearest centimeter.

1. _____
2. _____
3. _____
4. _____
5. _____

Measure to the nearest millimeter.

6. _____
7. _____
8. _____
9. _____
10. _____

QUIZ
DESIGNING A METRIC RACE CAR USING AUTOSKETCH®

Student Name

Fill in the blanks:

1. The letters CAD mean _____.
2. The CAD System uses a _____ to create the same kinds of drawings that are done on the drawing board.
3. Changes to drawings are called _____ and are quickly done on the computer screen.
4. The output device used to make a hard copy of your drawing is known as a _____.
5. The software program that you will use to design the race car is called _____.
6. The physical components that make up the computer system is called _____.
7. To save your information onto your disk, you must first place the disk in the _____.
8. When you store your work using the internal memory of the computer, you are storing the data on the _____.
9. To move the cursor around the computer screen, all you need to move is the _____.
10. When your work is completed and saved, you should _____ the program before shutting off the computer.