First make a backup of the JEM disk.
  If you are unsure how to make a copy read  the  section  in  your
DOS  manual  under the copy command.JEM must have a CGA or a EGA to
work a color monitor is not necessary a mono  (one  color)  monitor
is ok with a CGA EGA.
                -----------------------------------------
 To  use  this  tutorial  print  this file out to the printer or go
back to DOS and type in "copy tutor.prn  prn"  hit  enter.You  will
need a copy of this in front of you to use this tutorial.
 This  tutorial assumes that you know some DOS commands , if you do
not you will need your DOS manual. This  tutorial  will  teach  you
how  to  use  JEM  step  by  step.So start on the first page and go
through it slowly if you have a problem go back  a  page.After  you
get the hang of the commands JEM is very is easy to program in.

 First  JEM  is  a  LOGO  like  computer  language  or  a  Graphics
language. You can write computer programs in the JEM language  that
will  create  geometric  shapes  by  ordering the Turtle around the
screen. The following tutorial will teach  the  basic  commands  of
JEM.  The commands must be enter exactly as in this tutorial if the
screen does not look like the tutorial says it should  reenter  the
commands.
 IMPORTANT TYPE IN THE COMMANDS EXACTLY IF A LETTER IS IN
 CAPITALS  OR  IF  IT  IS  SMALLCAPS  LOOK  CLOSE  AT  THE  COMMAND.
--------------------------------------------------------
 Put the JEM disk in Drive A , type "jem" the screen  should  blank
and  a  small  pyramid  shape  should  appear  in the center of the
screen. The small pyramid shape is called the Turtle.  The  display
should  also  be  switched  To  the 40 character per line mode. The
bottom line of the screen will look like the line below.


          ?-                                              !


 This is the command line all JEM commands are entered here.
 Type in help the screen will now  be  in  80  character  per  line
mode.  The  screen  will  have two columns the column on the left is
the list of the commands "built into  JEM"  .  The  column  to  the
right  is  a  brief description of the command on the left,the last
line reads "Press any Key for more Help".
 Press the space bar five (5)times. You  have  the  Turtle  in  the
center  of  the screen and the bottom line should look like the line
below if the not press the space bar until the line appears.


          ?-                                              !


          This line is called the command line.

Moving the Turtle forward and back.

    To start to order the turtle around the screen type in  forw  [10]
    then  hit  enter  the  turtle  will move ahead ten (10) spaces. And
    will leave a line behind it. Type in **back** [20] then hit  enter  the
    turtle  will  back  up  twenty  (20)  spaces. Try moving the turtle
    forward 15 spaces type in **forw** [15] hit enter
    The turtle should move ahead fifteen spaces. Try moving the turtle
    back 12 spaces type in **back** [12] then hit enter.
    Try  moving  the turtle yourself when you feel confident in moving
    the turtle go on to next section.


Clearing the Screen

    To clear the screen type in **cs** hit enter.  The  screen  should  be
    clear now.

Turning the Turtle

    To turn the turtle type in **turn** [180] hit enter the turtle should
    be facing the command line. Type in  **turn**  [360]    hit  enter  the
    turtle  should  be  facing  the  top  of the screen. The turtle may
    turned in any direction between 0 and 360 using this command.

                              0

                   270     T      90

                        180
    Think of the top of the screen being 0 degrees and the  bottom  of
    the screen being 180 degrees. Or think of a compass ,the
    **turn**  [angle]  command will turn the turtle around like the pointer
    of a compass.

# Hiding and Showing the Turtle

The Turtle may be hidden (made to disappear) type in **hide** hit enter. The turtle should be gone type in **show** hit enter the turtle should be back. Try this commands a few times.

# Drawing Lines and Centering the Turtle

You can turn the line drawing by turtle on or off. Type in the command **upen** hit enter. Now type in the command **back** [25] hit enter. The turtle will have backed up 25 spaces and there will be no line drawn. Type in **dpen** hit enter , type in **forw** [25] hit enter. The turtle will have moved forward 25 spaces and drawn a line. Type in **upen forw** [30] hit enter the turtle should be 30 spaces forward and there should be no line drawn.
To put the turtle back in the center of the screen type **gh** hit enter. The turtle should be in the center of the screen.

# Switching Line Colors

You can switch the color of the lines first clear the screen by using the clear screen command. Type in **cs** hit enter.
Type in **forw** [5] **Clr** [3] **forw** [5] hit enter. You should have one line in two different colors. Type in **Clr** [2] **forw** [5] hit enter. The number of pen colors are 4 per palette (between 0 and 3). Try using the Clr command.

# Switching Palettes

To switch palettes type in 1 hit enter you now have the first palette of colors. Type in 2 hit enter you now have the second palette of colors.

# Turning Command line on or off

You can turn the command line on or off to turn the line off type in **Off** hit enter. To turn the command line on type in **Line** hit enter.

# Switching to 80 or 40 Characters per line mode

You can switch from 40 characters per line mode to the 80 character per line mode. Type in **Hi** hit enter you are now in the 80 character per line mode. Type in **med** hit enter you are now in the 40 character per line mode.

Exiting JEM
        Type in **end** hit enter the screen will clear  and  the  dos  prompt
    will appear.
         To go on with this Tutorial -
         At the DOS prompt Type in **jem** hit enter
         You will now be back in the the JEM program.
         If  the  user  has  created  a command JEM will ask if you wish to
    save the file before returning to DOS.
         (Note see loading and saving files).
         **The next commands  are  more  complex  make  sure  you  understand**
    **everything up to this point.**

Drawing a Box
         Using  the  commands  shown so far you may now order the Turtle to
    do some complex commands.  Like  drawing  a  box  first  clear  the
    screen use the **cs** command.
    Type in **cs** hit enter.
    Type in **forw [20] turn [90] forw [20]**  hit enter.
    Type in **turn [180] forw [20]** hit enter.
    Type in **turn [270] forw [20]** hit enter.
    Now to hide the Turtle
    Type in **hide** hit enter.
    You will now have a box drawn on the screen.
    Now clear the screen and show the Turtle
    Type in **cs show** hit enter

Right and Left Turns
         You  can  turn  the  turtle right of its current position by using
    the right turn command.
          Type in **rtrn [10]**  hit enter
         **(The turtle should be ten degrees right of where it started)**
         Type in **ltrn [10]** hit enter
         **(The turtle should be 1ten degrees left of where it started)**
         The **rtrn [angle]** and the **ltrn [angle]** will turn  the  turtle  from
    the current position.

To draw a box using the **rtrn** command
         First Clear the screen
         Type in **cs** hit enter
         Type in **forw [20] rtrn [90]** hit enter.
         Type in **forw [20] rtrn [90]** hit enter.
         Type in **forw [20] rtrn [90]** hit enter.
         Type in **forw [20] rtrn [90]** hit enter.
         Type in **hide** hit enter.

Using the again Command
         You  can  use  the  again command to make the computer do the hard
    work. To use the again command first clear the screen using the
    **cs** command and show the turtle.
    Type in **cs show**  hit enter.
    Type in **agn [4] forw [20] rtrn [90]** hit enter
    You now have a box on the screen.

## Using the Faster command

If speed of the drawing seems slow there is a  way  to  speed  the
Turtle up using the F command. First clear the screen.
Type in cs  hit enter
Type in F agn [4] forw [20] rtrn [90] hit enter.
This is the fast mode for the Turtle.

## Using the Pause Command

If  you  wish to have the Turtle stop and wait you may use the the
pse command. The pse (pause) command will stop the turtle and  wait
for  a  key  to be pressed before going on the next command. To use
the pse command first clear the screen -
Type in cs hit enter
Type in forw [30] pse rtrn [90] forw [20]  hit enter
The turtle will go forward 30 spaces and wait now hit any  key  on
the  key  board.  The turtle will now turn and go forward 20 spaces
and stop.

## Switching the Background color

To switch the background color use the B command.
Type in  B [3] hit enter
Type in  B [0] hit enter
There are 0 to 15 background colors that you can use with a CGA.
To reset to the default settings
Type in cs hit enter

## The Repeat Command

The Repeat command will repeat all the commands following it.  The
repeat  command  has  to  control keys they are the p key and the s
key. When the repeat command is running  hitting  the  p  key  will
pause  the  turtle  hitting any key but the s key will continue the
Repeat command. If you hit the s key the turtle will stop.  to  use
the repeat command-
 Type in Rept rtrn [93] forw [11] hit enter
 To pause the repeat command hit the the  p key.
 (Note do not hit the enter key)
 To continue the repeat hit the spacebar.
 (Note do not hit the enter key)
 To stop the repeat -
 Hit the p  key then hit the s key.
 (Note do not hit the enter key).
 Type in  cs hit enter

## To Enter Text on the screen

To  enter  text  on  the screen use the T command. To use the text
command-
 Type in T [2] Hello There ,  hit enter
 The number in the brackets is the line number to write  the  text.
The  message  you  wish  displayed  on  the  screen must end with a
comma.

## Creating your own programs or commands

JEM allows you to create your own commands using the commands  you have be shown. To create your own commands
Type in **expl** hit enter
Type in **tell** hit enter
Type in **Rightbox**= F agn [4] **forw** [30] **rtrn** [90] ; hit enter
The screen will now be back with the turtle and the command line.
Type in **Rightbox** hit enter.
The turtle will have drawn the box.

## Listing your own commands

Jem  allows  you  to  list your commands that you have created by using the the **show** command. To list your commands -
Type in **expl** hit enter
Type in **show** hit enter
Type in **all** hit enter
Jem will now list all the commands or words in memory.

## Forgetting a command you have created

Jem allows you to forget or get rid of commands that  you  do  not want or simple do not work as planned. To use the **forget** command-
Type in **expl** hit enter
Type in **forget** hit enter
Type in **Rightbox** hit enter
Hit enter
Hit enter
The command Rightbox is now gone.

## Loading Files

To load a file use the G command to use the the get file command-
Type in G  hit enter
You will now be asked for the file name -
Type in **jem.dat** hit enter
(Note  if  JEM.DAT  has been removed from your disk you will get a
 error comment)
Type in **expl** hit enter
Type in **show** hit enter
Type in **all** hit enter
Hit the enter key until you get the command line back.
When the Turtle and the command line return -
Type in **window** hit enter
You now have a window on the screen.
List the commands again and  try  some  of  the  words  listed  in
jem.dat

## Saving Files

If  you  use  the **expl** command during a session when you enter the
**end** command Jem will ask you if you wish to save the word  file  if
you  answer yes you will be asked for the name you wish to give the
file. Or you may use the the **Save**  command  to  use  the  the  save
command.
 Type in S hit enter
 You then be asked to give a file name
 Type in **Myfile.dat** hit enter

## Chaining Files

 JEM  allows  you  chain files and commands to use this command you
must know the file name and the first command you wish  to  execute
in that file.
 Type in Do **"jem.dat window"**  hit enter
 Jem will load the file **jem.dat** and execute the command window.
 The  **Do**  command  can  be  used  to load files also to use as file
loader only see page 9.

## Auto Run JEM

 Jem allows you to create an auto run file or an auto load file  to
use  the auto feature. You must use the file name **jem.run** rename or
create a file with this name. To use the the auto run  feature  the
word  or  command  **startup** must be in the jem.run file. The command
startup can be defined as what ever you wish.(See page 9)

## Variables

Jem allows two variables they are **var1** and **var2.** To set the  value
in the variables -
Type in **s** [var1=1] hit enter
Type in **s** [var2=5] hit enter

To add to the current value of the variables

Type in **s** [var1+2] hit enter
(this will add 2 to the current value of **var1**)
Type in **s** [var2+3] hit enter
(this will add 3 to the current value of **var2**)

To subtract to the current value of the variables

Type in **s** [var1-2] hit enter
(this will subtract 2 from the current value of **var1**)
Type in **s** [var2-3] hit enter
(this will subtract 3 from the current value of **var2**)

To use a variable -

Type in **forw** [var1] **turn** [var2] hit enter

## Screen wrap ON or OFF

The  screen  normally  wraps around that is to say that the turtle
if it goes off the top of the screen it will appear at  the  bottom
of  the  screen.  You  can  turn  the the wrap off if you wish that
means the turtle will not appear at the bottom  of  the  screen  if
the  turtle runs off the top of the screen. The command to turn the
wrap off is **nwrp** to turn the wrap on the command is **wrap.**

To print out JEM's display turn the command line off,turn your printer on, hit the print screen key.

JEM is language similar to the computer language FORTH , user words or commands may defnded using the pre-defined commands and/or user defined commands to create more commands. Load the file JEM.DAT to see examples of user created commands.

Chaining of files the user can chain any number of files to each other. The Auto run feature must have the JEM.RUN in the same directory as JEM.COM and the word **startup** must be used in the file JEM.RUN to start the auto run feature. To see how the auto feature works rename the file JEM2.DAT as JEM.RUN the load JEM. There is a small demonstration command in that file.

User defined commands can be repeated in the same data file **but** JEM will use the first definition only. The same word can be defined in a different file as a different command. User defined commands **must be longer than five (5)** characters in length for JEM to use them.

When using the **ag** (again) command care must used not to nest the the again command. Example of a nested command is **ag** [5] **forw** [10] **ag** [4] **forw** [10] **rtrn** [3].

To use the **Do** command to load files **only** simply do not give the command a word to execute. Example of a file load using the the **Do** commmand.

Type in **Do jem.dat** hit enter
Jem will load the file and return to the command line.
Also a user defined command can call itself if you do this JEM will go in to endless loop. You can try Ctrl c to stop JEM but you may need to shut the system off to end the loop.

Look at the JEM.DOC for addition information see next page for command abbreviations.

Jem basic commands can be shorten to one character to save time and space when the user creates their own commands here is a list of the shorten commands.

| Function | Command | Short Command |
|---|---|---|
| Moving the turtle forward | forw [spaces] | f [spaces] |
| Moving the turtle backwards | back [spaces] | b [spaces] |
| Clear screen | cs | c |
| Turn to a compass point | turn [angle] | t [angle] |
| Hide the turtle from view | hide | h |
| Show the turtle | show | s |
| Turtle pen up | upen | u |
| Turtle pen down | dpen | d |
| Switch line colors | Clr [number] | C [number] |
| Switch to Palette 1 | 1 | 1 |
| Switch to Palette 2 | 2 | 2 |
| Command line on | Line | L |
| Command line off | Off | O |
| 40 Chars per line(default) | med | m |
| 80 Chars per line | Hi | H |
| Exiting JEM | end | end |
| Right turns | rtrn [angle] | r [angle] |
| Left turns | ltrn [angle] | l [angle] |
| Again x times | agn [times] | a [times] |
| Faster command | Fast | F |
| Pause wait foe keypress | pse | p |
| Seting Background Color | Back [number] | B [number] |
| Repeat Command | Rept | R |
| Put text on screen | T [line] here , | T [line] here, |
| Get a data file | G | G |
| Get a data file | Do filename | D filename |
| Save a data file | Save | S |
| Get file Do a command | Do file command | D file command |
| Screen wrap on | wrap | w |
| Screen wrap off | nwrp | n |
| | | |
| Variable # 1 | var1 | var1 |
| Variable # 2 | var2 | var2 |
| Explain to Turtle | explain | exp |

The following page will let you try some user defined commands  in
the data file JEM.DAT to see how the commands work.

 You can get a print out of the file JEM.DAT to look at by going to
DOS put the JEM disk in the disk drive. At the DOS prompt-

          Type in   copy jem.dat prn hit enter

           After the printer is done load the JEM  program  at  the  DOS
          prompt -

            Type in   jem  hit enter

 This  page  has  a number of commands in the JEM.DAT file the user
can try and look at. First load the data file jem.dat-

          Type in    D jem.dat         hit enter
          Type in    R shapes          hit enter

 Jem will draw a number of shapes on the screen

          Type in   cs R shapes2     hit enter

 Jem will draw some more shapes on the screen

   To see the difference in drawing speed using the Repeat command
 try this
            Type in   cs shapes2       hit enter

  When the turtle is finshed try the same  word  using  the  Faster
command.
            Type in   cs F shapes2      hit enter

  There is a noticeable difference in drawing speed.
  You can use the turtle to draw letters also try

          Type in  cs F startwrite   hit enter
 Now  you  can try some of the other words in the JEM.DAT file. Try
creating some words try

          Type in    expl     hit enter
          Type in    tell     hit enter
          Type in   myword1= cs F startwrite ;  hit enter

Get back to the command line and the turtle on the screen then -

          Type in   myword1  hit enter

Try creating your own words on your own now.

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