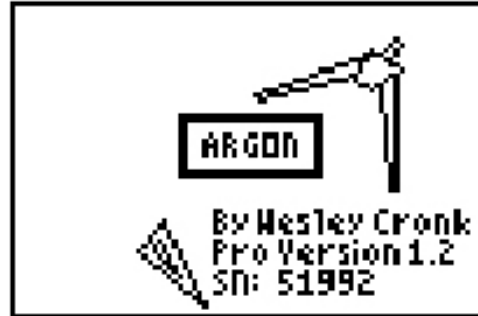


Argon Pro v2.1

...and included files

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1: About Argon

Argon is a 3D drafting/graphics program written in BASIC for the Ti-83+, by Wesley Cronk. I've spent about a year working on this, and I am planning many more changes to this, including the possibility of changing it into an application.

Known Bugs:

- 1: Sometimes the file defragmenter makes the last shape disappear.
- 2: Problems with the "Revert" function.

2: Installing Argon

This .zip file comes with two different ways to install Argon. You can send the Group file to the calculator, or you can install all the individual files. The individual files are prgmARGON, LARG (The RAM file), LARGO (The Options file), LARGS1 (First saved file), LARGS2 (Second saved file), LARGS3 (Third saved file), and a bunch of other lists that somehow needed use in the rendering program, prgmARGDEF (File Defragmenter), prgmARGRTL (Render To List), and prgmARGEDIT (File editor). Putting the group on your calculator and ungrouping it will automatically install it for you.

Ungrouping a file: Press [2ND] [MEM] [8] {Right Arrow}, and select ARGINST. Press enter. **Be sure to delete any previous version of Argon before installing this version!** To send Argon to another calculator, just send the group file.

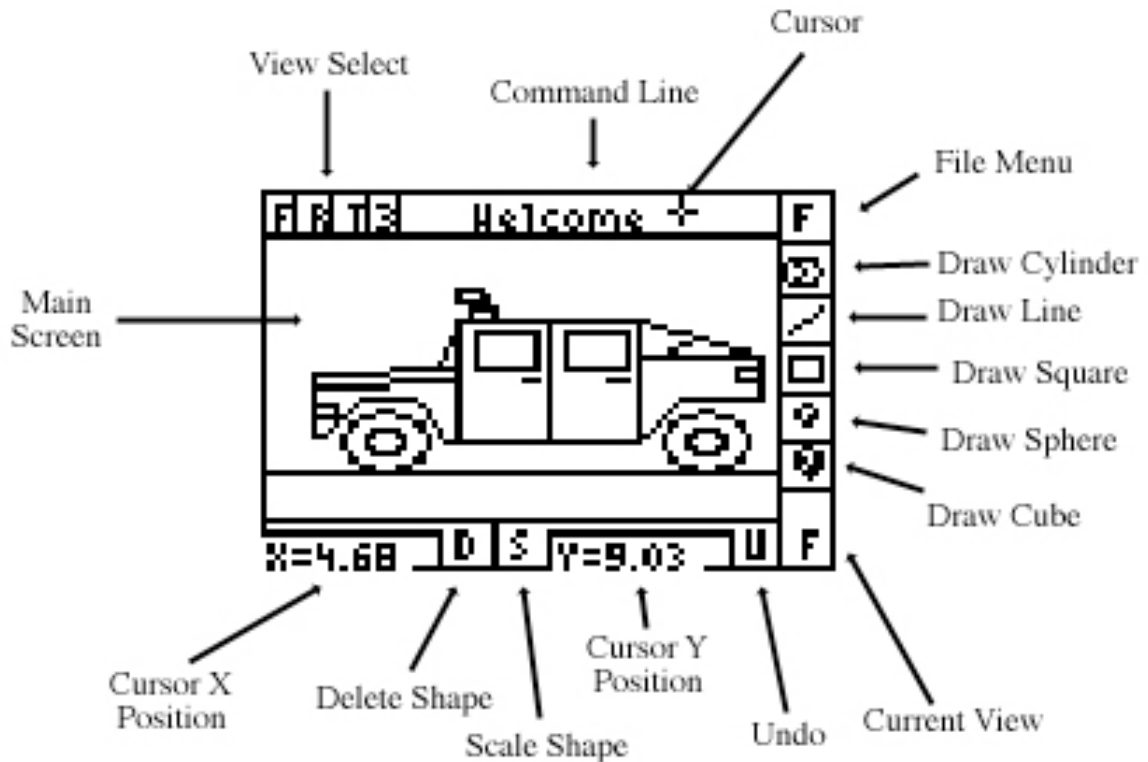


3: Using Argon

Since Argon is a BASIC program, you need to un-archive it to use it. You do this by going to [2ND] [MEM] [2] [7], and scrolling to ARGON. Press enter. An asterisk means the program is archived. No asterisk means that the program is un-

archived (in RAM). Press the [PRGM] key, and scroll to Argon. Press enter.

At the introduction screen, press enter. You should now be faced with the main menu. See the picture below for the interface.



4: The Argon Interface:

Command Line: This is where the program communicates its needs with you. If you move your mouse over this line, and press enter, then it brings up a command line. Acceptable commands are (written in all uppercase): **New, Open, Save, Revert, Quit, Front, Right, Top, 3D, Delete, Scale, Undo, Cylinder, Line, Square, Sphere, Cube.**

```
PRGMARGON
Command: OPEN
Command: OPEN
Command: QUIT
```

Cursor: Your cursor is how you click on buttons and draw things. To move the cursor, use the arrow keys. To click, press enter. While you're moving the mouse, the X and Y coordinates of the cursor are displayed at the bottom.

Main Screen: This is where your drawing shows up. If a shape is larger than the main screen, then the shape will go over the buttons (cool!).

Delete Shape: I'm sure we can all guess what this does! It asks for a shape number (you may want to keep track of which shapes are what number!), then deletes that shape. Deleting shapes causes the file to become very fragmented, so after deleting a few shapes, it will be good to run the defragmenter.

Undo: Automatically deletes the last shape drawn. **There is no redo function, so be careful about what you delete!** There is no need to defragment after using the undo function.

Scale Shape: Asks for a shape number, then a scale factor. Scales the shape by that factor.

Current View: Tells you which view you're in.

Draw Cube: Will ask for centerpoint and radius. While it's doing this, you can click on the command line to enter these coordinates by hand.

Draw Sphere: Same as draw cube.

Draw Square: Will ask for centerpoint, radius, and direction to face.

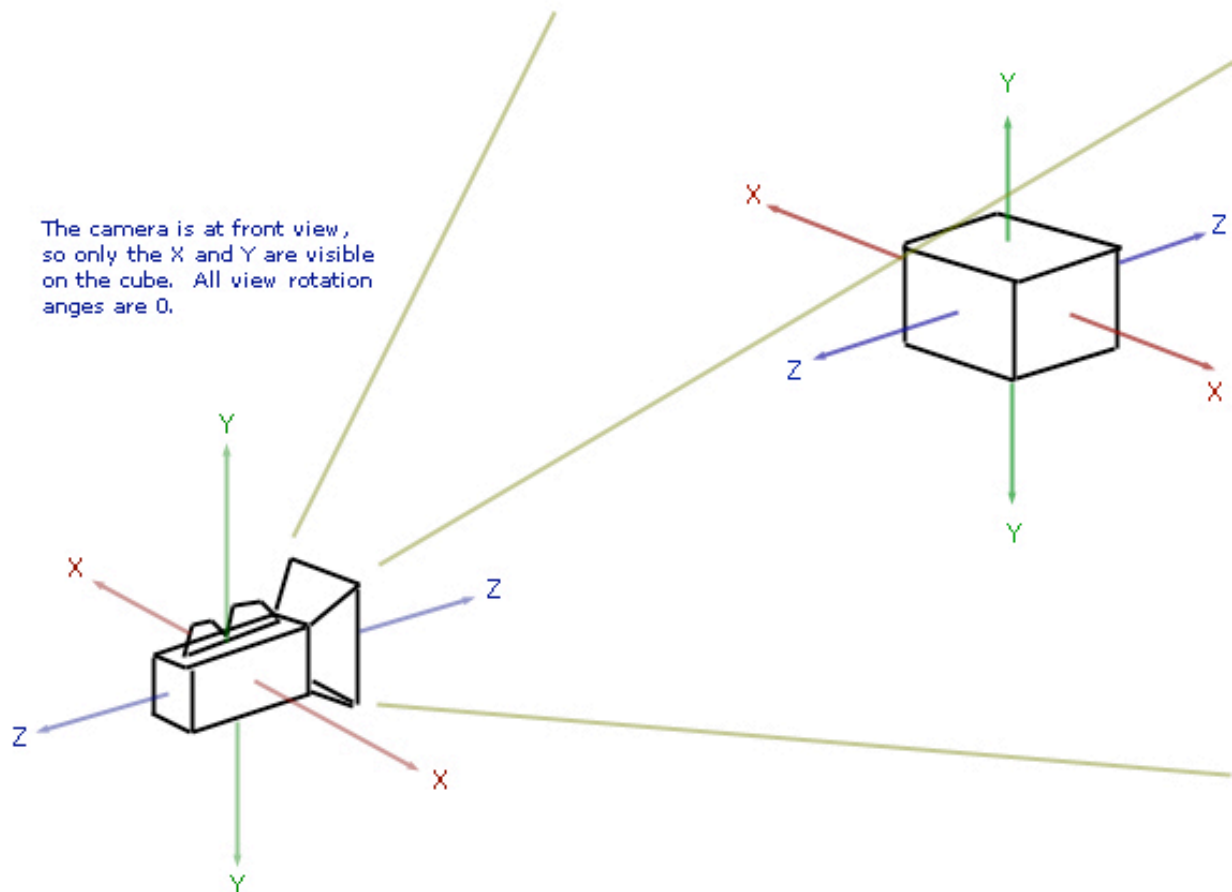
Draw Line: Will ask for start location and end location.

Draw Cylinder: Will ask for the centerpoint, radius, direction to face, and thickness (height).

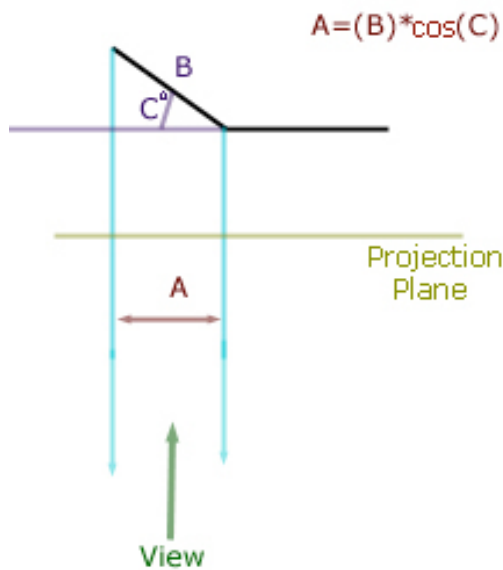
File menu: Contains the options New, Open, Save, Revert, and Quit.

5: Introduction to 3D

It takes a little bit of work to make your mind think in 3D, but the result is well worth it. First, take a sheet of graph paper with the X and Y coordinates. Then, extend another dimension out, upwards. This is the Z dimension. Any points in a 3 dimensional system must have three coordinates (x, y, and z). As far as shapes and your view goes, there is also three rotation angles: x, y, and z.



Rotation around the X axis is called Pitch. Rotation around the Y axis is called Yaw, and rotation around the Z axis is called Roll.



In order to put 3D coordinates on a 2D plane (the screen), you have to use a method called projection. Pictured below is a method for projecting a 2D object onto a 1d line. B is the real length of the line. C is the angle that it is from being perpendicular to the viewing angle. A is the length that the line appears on the screen.

It's pretty much the same process for turning 3D objects into 2D ones, however, you have to account for twelve numbers: Shape coordinates XYZ, Shape rotation XYZ, View rotation XYZ, and View location XYZ. For more information on 3D and projection, there are lots of helpful sites out there on the

internet.

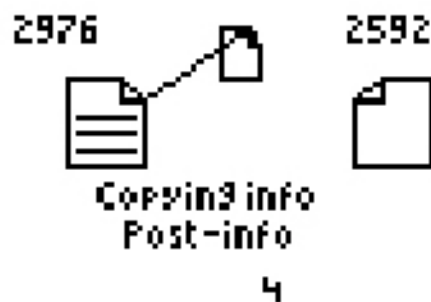
6: Rendering

To render, unarchive prgmARGRTL. Run this program, and it will render the file you last worked on (the RAM file). This will ONLY render lines. A later version may be able to render more. Even so, this renderer will accurately render both orthographic and perspective views. Press the arrow keys to rotate the view, and the + and - keys to zoom in and out.

7: File Defragmenter

Using the delete command will fragment your file, and even though the shape is gone, the space that it's taking up is still there. Argon stores all it's data in a list. When it deletes a shape, it just stores 0's in the shape data. The file defragmenter moves up the shapes, getting rid of the extra zeros, making the file faster and smaller. Depending on how many shapes you deleted, and how large your file is, this could take a long time (5+ minutes).

Please Note: A known bug for the file defragmenter is to sometimes make the last shape "disappear". Before you defragment the file, you may want to save it and/or make a small line or something, so that you keep your real last shape.



The number in the upper left is the size of the current file. The number in the upper right is the size that the file could be. The number on the bottom is the number of shapes it still has to defragment.

8: File Editor

Argon also comes with a file editor. You can use this to manually edit the data in the Argon files. This may seem confusing at first, but sometimes you need it.

The diagram shows a terminal window titled 'ARGEDIT(LARG) 16,23'. The window contains a table of shape data. Labels with arrows point to various parts of the interface:

- Total no. of shapes**: Points to the number '31' in the top left.
- List name**: Points to the title 'ARGEDIT(LARG)'.
- View locations (from,to)**: Points to the numbers '16,23' in the top right.
- Key to edit**: Points to the first column of the table (1:16).
- List Location**: Points to the second column of the table (16).
- Data**: Points to the third column of the table (1).
- Description**: Points to the fourth column of the table (TYPE).

| Key to edit | List Location | Data | Description | |
|-------------|---------------|-----------|-------------|-------------------------|
| 1:16 | 16 | 1 | TYPE | Shape Type |
| 2:17 | 17 | 5.5319149 | CP(X),A(X) | CenterPoints |
| 3:18 | 18 | -3.225806 | CP(Y),A(Y) | and |
| 4:19 | 19 | 0 | CP(Z),A(Z) | Start Locations |
| 5:20 | 20 | 1.4893617 | Rad,B(X) | Radius/End(X) |
| 6:21 | 21 | 0 | Dir,B(Y) | Direction Facing/End(Y) |
| 7:22 | 22 | 0 | B(Z) | Height/End(Z) |
| 8:23 | 23 | 0 | - | |

Key to Edit: Press this key to edit the following data.

The Manual Editor takes a little bit of time to get used to, but you may need to use it multiple times.

9: Contact and Extras

Contact: You can contact Wesley Cronk at president@arasian.com or view The Vortex website at <http://www.arasian.com/vortex>. The Argon support page is <http://www.arasian.com/vortex/argon.htm>

Upcoming: In some version in the future, Argon will have: Built in editing and compression/defragmenting, file locking, file merging, real time scaling, rotating, and translating. Improved interface and drawing controls, hidden lines, text creation, and finally, it may be an app.

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