

FREE CUTLIST PROGRAM

When I was reviewing the project to build the desks for HAART, I wanted to make sure we had enough wood and we also optimized our cutting to minimize the waste wood. I found a free Cutlist program that I saw recommended on a few woodworking forums and decided to give it a try. It seems to work pretty good and thought I would share with you on where you can download it and how to use it.

The website to download the program is <http://www.delphiforfun.org/Programs/CutList.htm> This is what you should see when you go to this website:

Cut List

[Home](#) [Puzzles & Projects](#) [Delphi Techniques](#) [Math topics](#) [Library](#) [Utilities](#)

Problem Description

21.6 1/2 x 31.736	2.5 1/2 x 39.14	1.5 1/2 x 20.394
3.5 1/2 x 39.14	26.5 1/2 x 35.1/2	35.5 1/2 x 20.394
28.5 1/2 x 35.1/2	35.5 1/2 x 35.1/2	1.5 1/2 x 20.394
28.5 1/2 x 35.1/2	31.5 1/2 x 35.1/2	1.5 1/2 x 20.394

A "Cut List" shows woodworkers how to cut a set of parts from a set of available stock. This program creates a diagram showing the stock pieces and how the required parts may be cut from them.

Data may be created, deleted, modified and saved to a file for later use. Users can specify the width of material lost during cutting (saw blade kerf width), and the minimum dimension of waste material to report.

Solution searches give priority to crosscuts (vertical on the screen) or rip-cuts (horizontal) first or will try a Combination approach using all possible mixes of both types of cuts.

Background & Techniques

This program was originally written 10 years ago, in 1993, to solve a particular woodworking problem. This year I'm making picture frames for motivational posters for our 7 grandkids and needed to decide whether to buy the backing and Plexiglas pieces precut or cut it myself from 4'x8' sheets. (Only 6 pieces 22"x28" can be cut from a sheet, so precuts were a better choice.)

I decided to update and publish the program for others to play with. I have included several sample files which should make things clear. A couple of potentially confusing points:

- Width** of boards is represented vertically on the screen. **Length** of boards is represented in the horizontal screen dimension.

There are three options controlling the solution search: **Cross cuts first**, **Rip cuts first**, and **Combination**. I recommend trying all three and using the one you like best. The "Combination" option tries all combinations of ripping and cross cutting to find the best solution.

The best solution here is defined as the cutting pattern which produces the leftover piece with the largest area.

Non-programmers are welcome to read on, but may want to jump to bottom of this page to [download the executable program now](#).

Programmer's Notes:

Scroll down the page to almost the bottom and you will see a section called "Running/Exploring the Program".

supply piece diagrams would be printed. Fixed to day with **Version 4.03**. Layout diagram page titles now also show which solution is being printed.

May 28, 2016: And the fixes continue - the same problem fixed last month for computer discovered solutions also rolled over to printing of "human" generated solutions. **Version 4.04** posted today fixes that printing problem also.

March 19, 2017: **Version 4.05** posted today merely corrects a few misspelling and truncated text errors caught by a couple of sharp eyed users. Thanks to Karson and Anthony for taking the time to let me know.

May 18, 2018: A 2 line change to Cutlist today changed part diagram outlines from green to black. The previous green outlines and the light green fill color both mapped to the same shade of gray when printing in black/white and, if the parts were adjacent, the boundaries disappeared! **Version 4.05.1** posted today fixes that.

Running/Exploring the Program

- [Download executable](#)
- [Where is the source code?](#)

I withdrew the source code a couple of years ago for two reasons:

- 1) It is a popular download and complex enough that I was receiving requests for help in understanding or changing it a few times a year. Each time it would take me a day to relearn the code myself. It had grown beyond the "for fun" stage.
- 2) It is a very popular download and clearly has commercial possibilities. I have a dozen or more good enhancement suggestions waiting to be implemented and I may release a "for pay" version one of these days. The donation model just doesn't work very well as compensation for time spent working on the program.

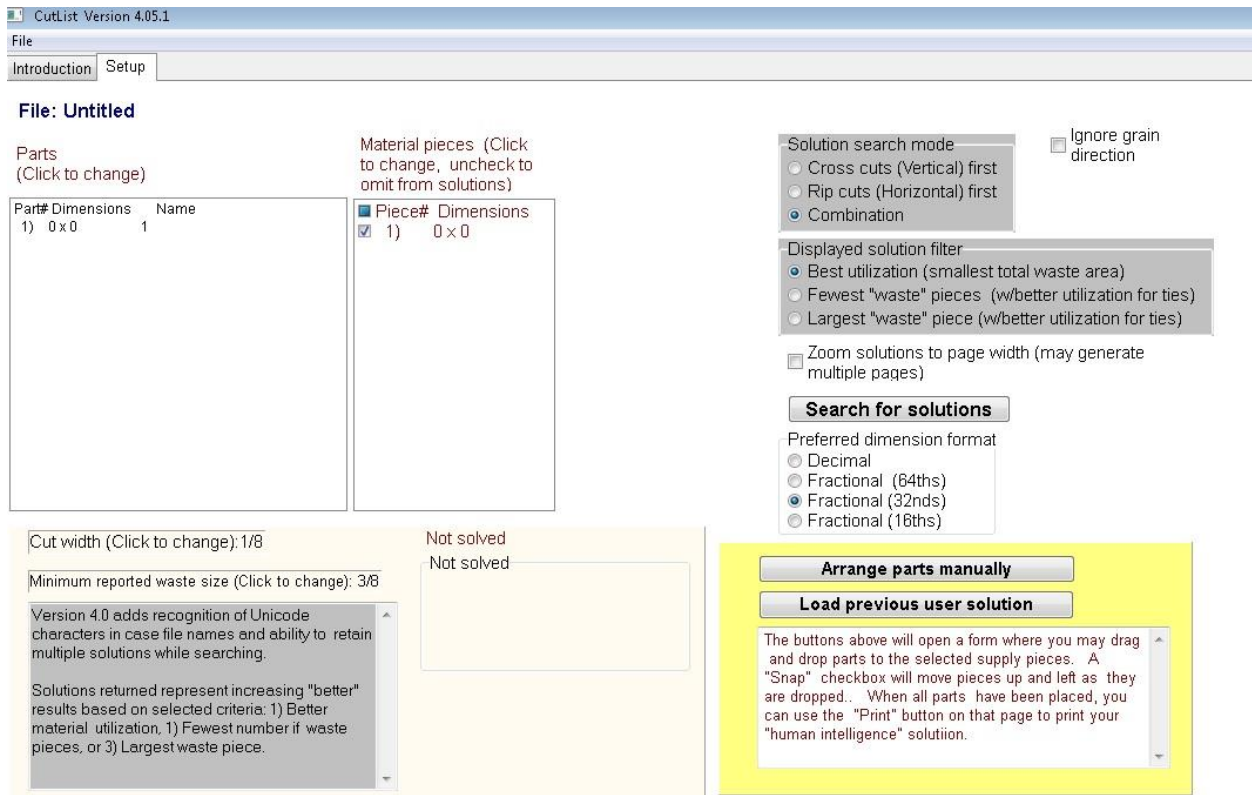
If you have enhancement suggestions, I'll be happy to add them to my list. For commercial use, I can grant a license for company internal use for \$500. This includes the program source code. The license specifically excludes rights to sell or distribute the following outside of your company. CutList, any modification to CutList, or programs you develop based on CutList. If you are interested, provide me with the name and address information for your company and make the \$500 donation via the PayPal link on any page of the DFF website.

Suggestions for Further Explorations

- ✖ Done Jan 2005. Add an option to allow pieces to be rotated if doing so would make more efficient use of material. (An "ignore grain" option.)
- ✖ Are the lists produced optimum? Probably not. Optimum is currently defined as the largest single leftover scrap piece, but other definitions are certainly possible.
- ✖ "Saw kerf width" and "Smallest reportable scrap" should be saved and reloaded with the project files. Currently only the required parts and the available supply pieces are saved.
- ✖ Done, Feb 2005 - A Print option for results list and cutting diagram.
- ✖ The order in which required parts are cut from available stock pieces can affect the results. The current default is to cut the largest parts first from the smallest supply pieces. Perhaps we should try cutting from all possible arrangements of supply parts.
- ✖ Done January 2006. Need to be able to zoom displayed solutions for better readability for large project solution displays.

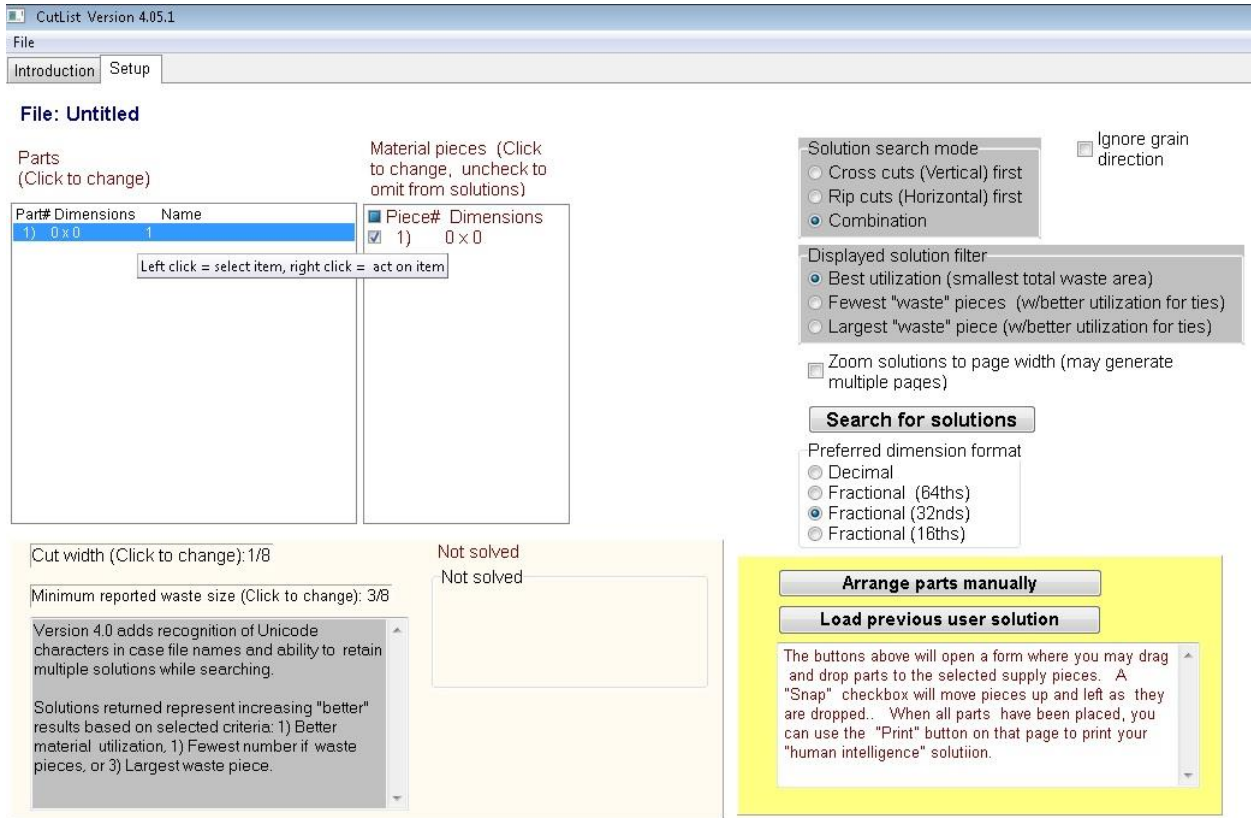
In this section, there will be a link labelled “Download Executable”. Click on this link and select Save File. It will download a zipped file to your computer called Cutlist.zip. You will then need to unzip this file and save it to whatever folder on your computer you would like to keep it.

After you unzip the file, go to the folder on your computer where you saved the files and you should see a file called CUTLIST400.exe. Double click on that file name to start the program. When the program starts you should see a screen like this on the “Setup” Tab:

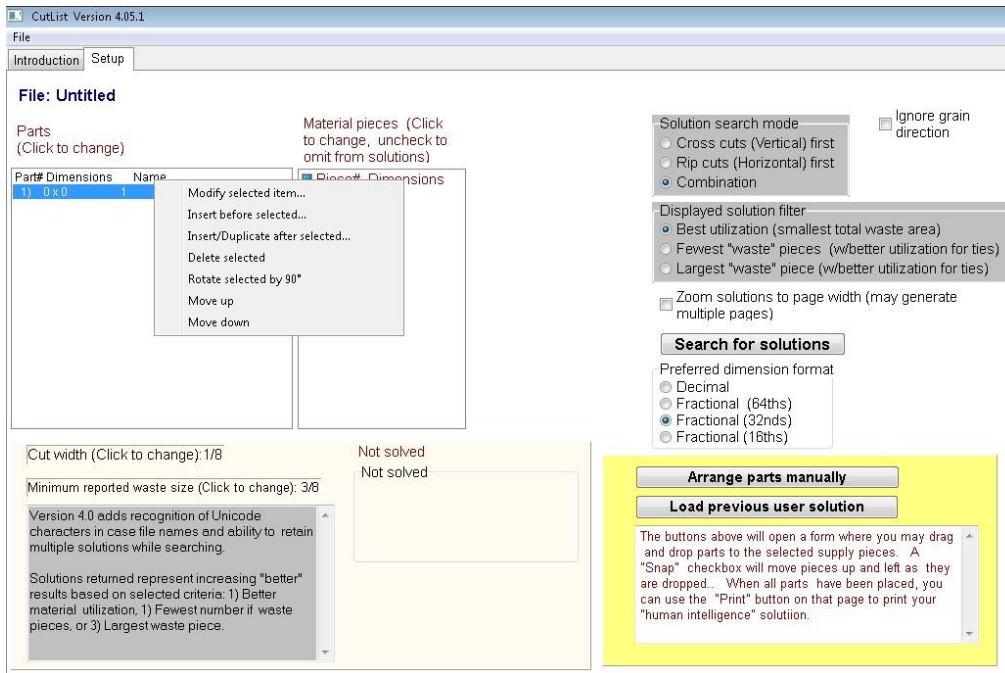


The box on the left is labelled “Parts”. This is where you add the dimensions for all the pieces that you want to cut out. The box on the right of it labelled “Material pieces”. This is where you add the size of the pieces of wood you will be cutting from.

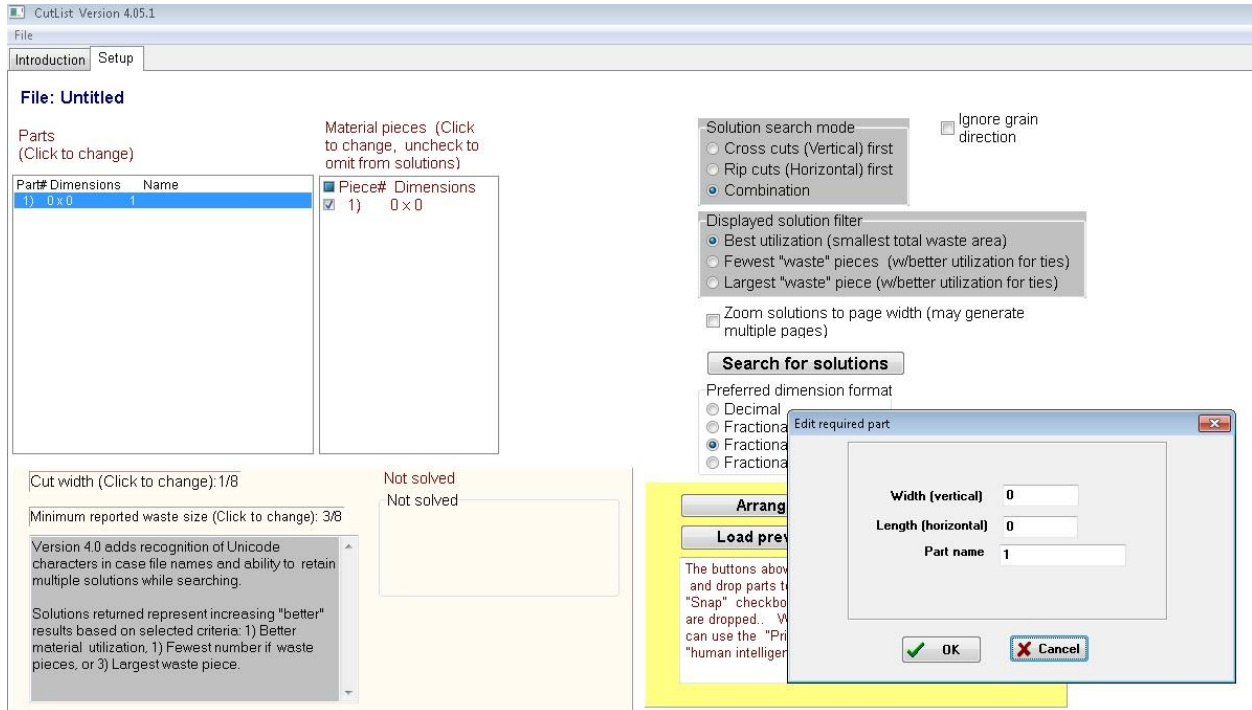
I will go thru an example of what I did to generate a cutlist for the 3/4” hardwood pieces for the 2 HAART desks that we were going to build. To start adding the pieces that you want to cut out, you will first click on Part #1 to select it and it will be highlighted in blue.



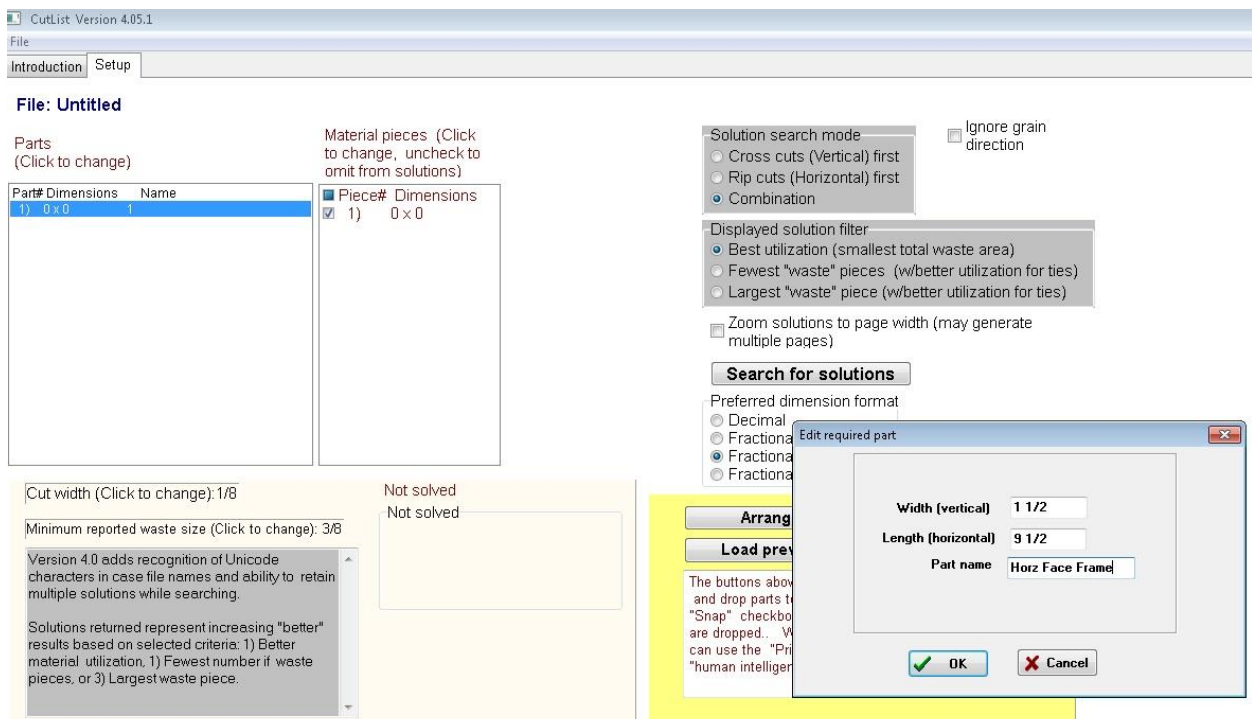
You then right click on that highlighted Part #, and you will get a dialog box of options to choose from:



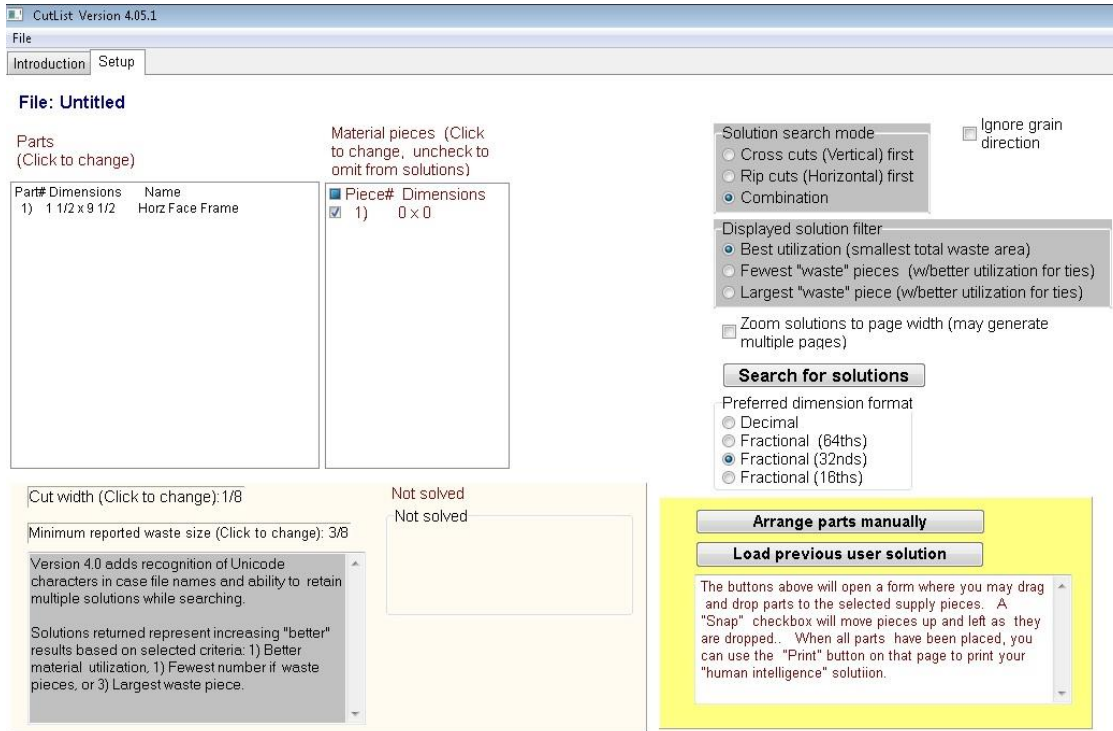
I clicked on "Modify selected item...". You will then get a dialog box that pops up asking you for the dimensions of that part:



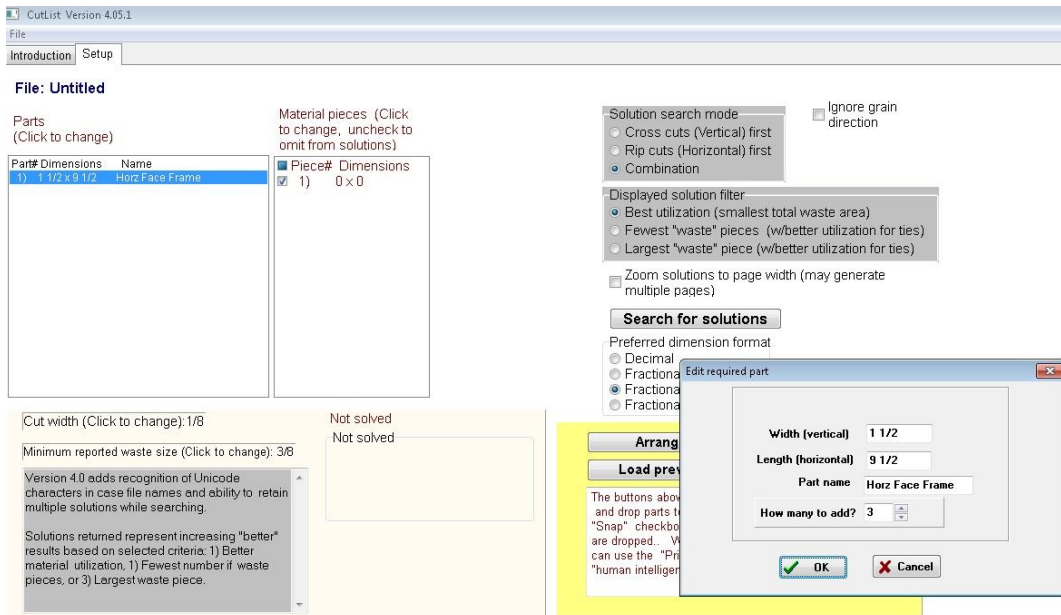
Enter in the Width and Length of the first piece you want to cut out. You can enter the dimensions as either decimal or fractional (e.g. 4.125 or 4 1/8). You can then enter the Part Name. So I added the Horizontal Face Frame piece which is 1 1/2" wide and 9 1/2" long.



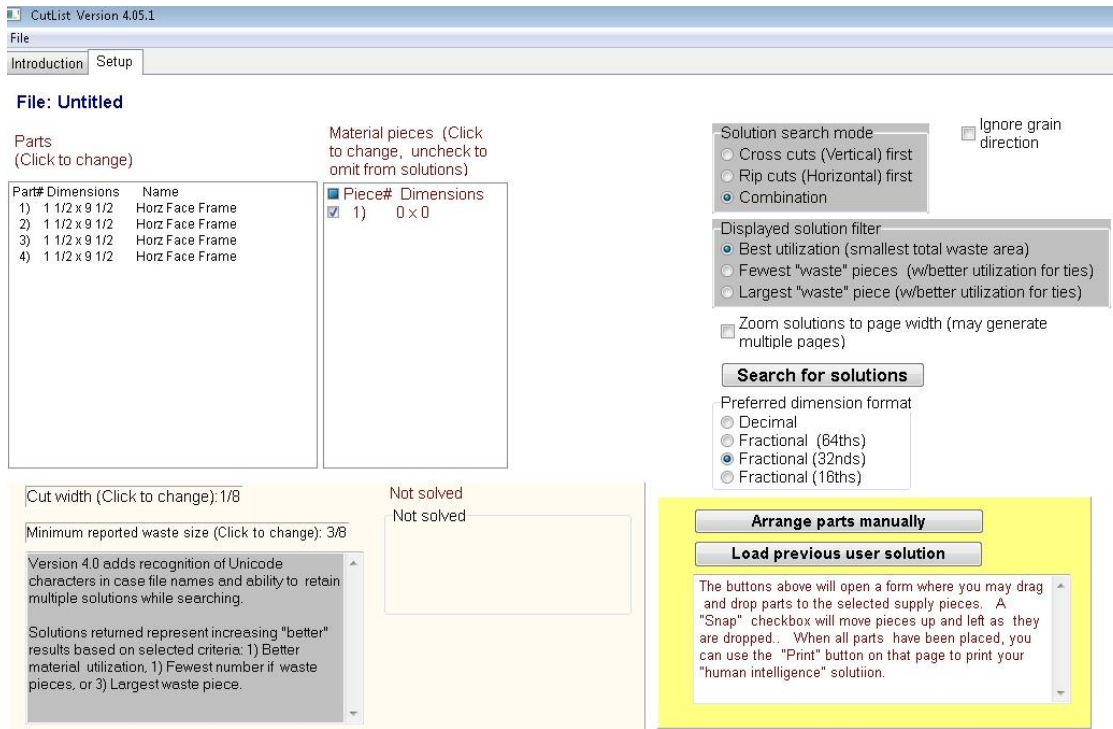
After you click on “OK”, you will see the piece added to the Parts List box.



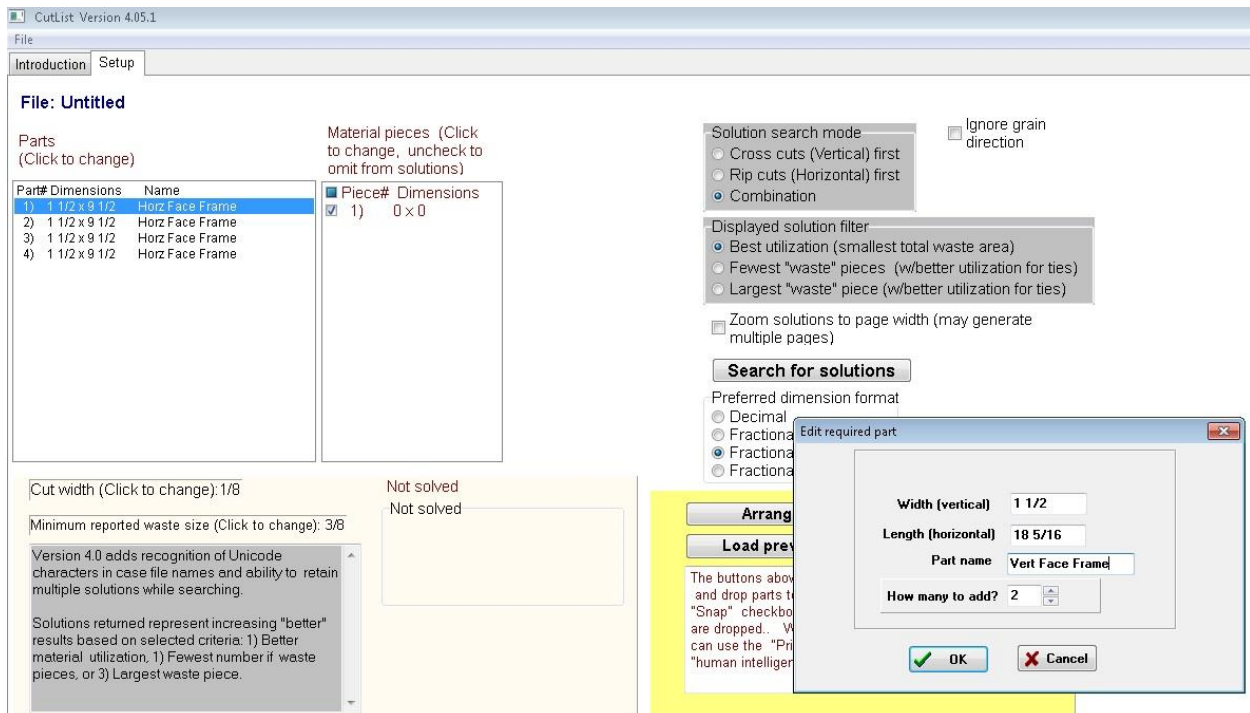
Since we were building 2 desks and there are 2 identical sized Horizontal Face Frame pieces per desk, I needed a total of 4 Horizontal Face Frame pieces. So I selected the Horizontal Face Frame piece by clicking on it and then right clicking on it to bring up the dialog box of options. I then selected the option to “Insert Duplicate after selected”. Since I needed 3 more pieces to make a total of 4 pieces, I entered 3 into the “How many to add?” field.



After you click on "OK", you will see 3 more identical pieces added to the Parts list:



I then continued adding the other pieces. I clicked on Part #1 to select it, right clicked on it to bring up the option dialog box and then selected "Insert before selected". I then added the Vertical Face Frame pieces which are 1 1/2" x 18 5/16" and I need 2 of these pieces since we are making 2 desks.



After clicking "OK", the 2 Vertical Face Frame pieces are added above the Horizontal Face Frame pieces.

File: Untitled

Parts (Click to change)

Part#	Dimensions	Name
1)	1 1/2 x 18 5/16	Vert Face Frame
2)	1 1/2 x 18 5/16	Vert Face Frame
3)	1 1/2 x 9 1/2	Horz Face Frame
4)	1 1/2 x 9 1/2	Horz Face Frame
5)	1 1/2 x 9 1/2	Horz Face Frame
6)	1 1/2 x 9 1/2	Horz Face Frame

Material pieces (Click to change, uncheck to omit from solutions)

Piece#	Dimensions
<input checked="" type="checkbox"/> 1)	0 x 0

Solution search mode

- Cross cuts (Vertical) first
- Rip cuts (Horizontal) first
- Combination

Ignore grain direction

Displayed solution filter

- Best utilization (smallest total waste area)
- Fewest "waste" pieces (w/better utilization for ties)
- Largest "waste" piece (w/better utilization for ties)

Zoom solutions to page width (may generate multiple pages)

Search for solutions

Preferred dimension format

- Decimal
- Fractional (64ths)
- Fractional (32nds)
- Fractional (16ths)

Cut width (Click to change): 1/8

Minimum reported waste size (Click to change): 3/8

Version 4.0 adds recognition of Unicode characters in case file names and ability to retain multiple solutions while searching.

Solutions returned represent increasing "better" results based on selected criteria: 1) Better material utilization, 1) Fewest number if waste pieces, or 3) Largest waste piece.

Not solved

Not solved

Arrange parts manually

Load previous user solution

The buttons above will open a form where you may drag and drop parts to the selected supply pieces. A "Snap" checkbox will move pieces up and left as they are dropped. When all parts have been placed, you can use the "Print" button on that page to print your "human intelligence" solution.

I then continued adding all the different pieces needed like the Rear and Front leg pieces and ended up with this Parts List:

File: Untitled

Parts (Click to change)

Part#	Dimensions	Name
1)	1 1/2 x 26 3/4	Front Leg Piece
2)	1 1/2 x 26 3/4	Front Leg Piece
3)	1 1/2 x 26 3/4	Front Leg Piece
4)	1 1/2 x 26 3/4	Front Leg Piece
5)	1 1/2 x 26 3/4	Front Leg Piece
6)	1 1/2 x 26 3/4	Front Leg Piece
7)	1 1/2 x 26 3/4	Front Leg Piece
8)	1 1/2 x 26 3/4	Front Leg Piece
9)	1 1/2 x 28 1/4	Rear Leg Piece
10)	1 1/2 x 28 1/4	Rear Leg Piece
11)	1 1/2 x 28 1/4	Rear Leg Piece
12)	1 1/2 x 28 1/4	Rear Leg Piece
13)	1 1/2 x 28 1/4	Rear Leg Piece
14)	1 1/2 x 28 1/4	Rear Leg Piece
15)	1 1/2 x 28 1/4	Rear Leg Piece
16)	1 1/2 x 28 1/4	Rear Leg Piece
17)	1 1/2 x 18 5/16	Vert Face Frame

Material pieces (Click to change, uncheck to omit from solutions)

Piece#	Dimensions
<input checked="" type="checkbox"/> 1)	0 x 0

Solution search mode

- Cross cuts (Vertical) first
- Rip cuts (Horizontal) first
- Combination

Ignore grain direction

Displayed solution filter

- Best utilization (smallest total waste area)
- Fewest "waste" pieces (w/better utilization for ties)
- Largest "waste" piece (w/better utilization for ties)

Zoom solutions to page width (may generate multiple pages)

Search for solutions

Preferred dimension format

- Decimal
- Fractional (64ths)
- Fractional (32nds)
- Fractional (16ths)

Cut width (Click to change): 1/8

Minimum reported waste size (Click to change): 3/8

Version 4.0 adds recognition of Unicode characters in case file names and ability to retain multiple solutions while searching.

Solutions returned represent increasing "better" results based on selected criteria: 1) Better material utilization, 1) Fewest number if waste pieces, or 3) Largest waste piece.

Not solved

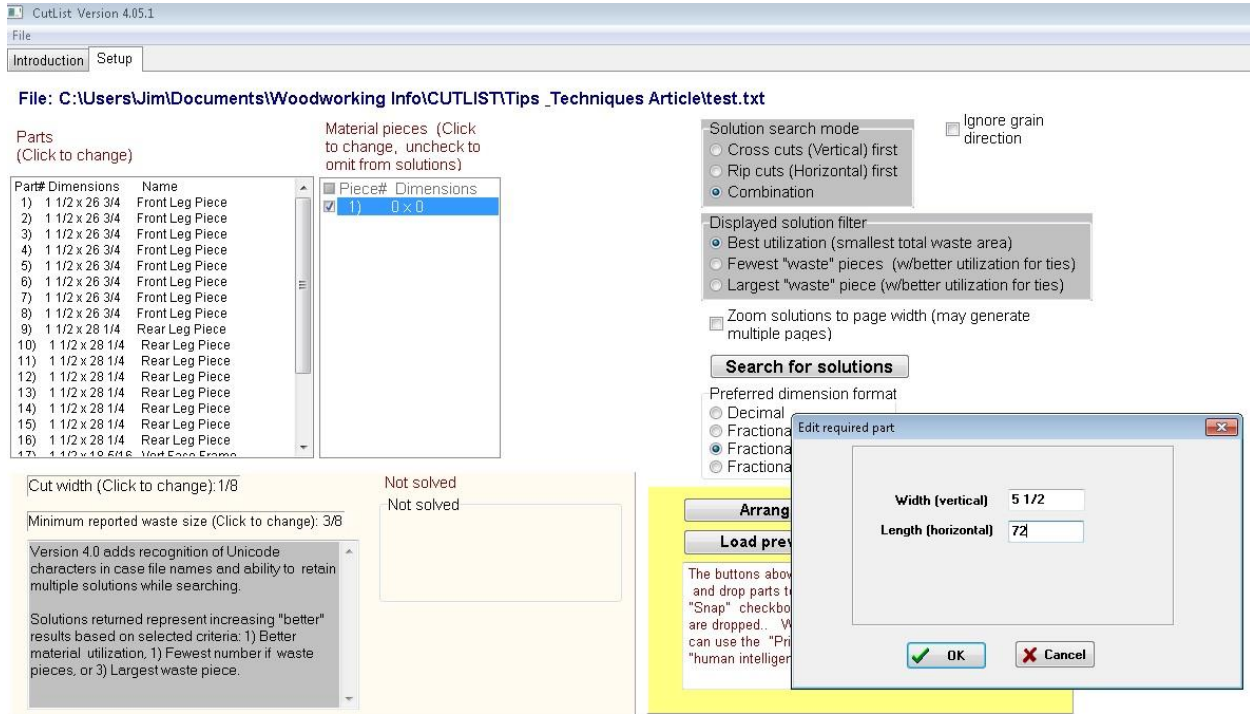
Not solved

Arrange parts manually

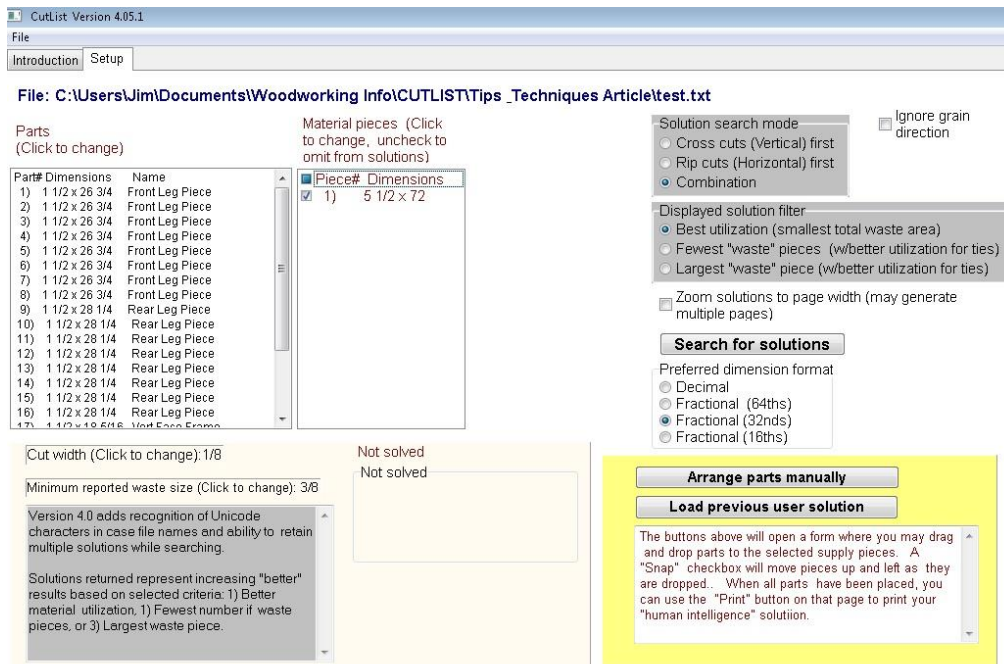
Load previous user solution

The buttons above will open a form where you may drag and drop parts to the selected supply pieces. A "Snap" checkbox will move pieces up and left as they are dropped. When all parts have been placed, you can use the "Print" button on that page to print your "human intelligence" solution.

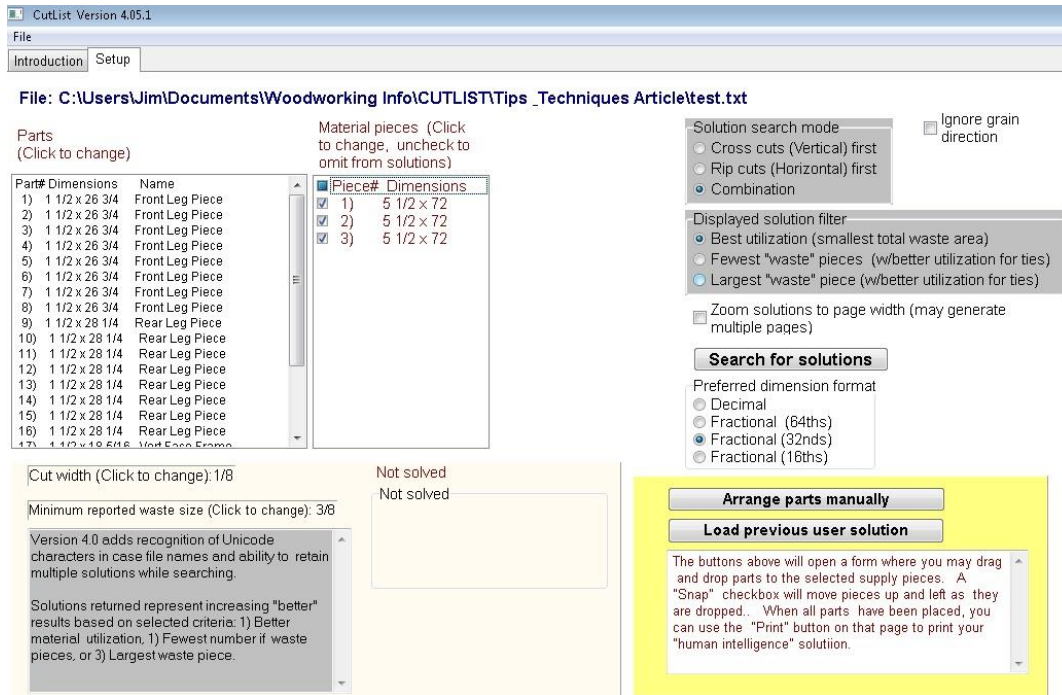
Now you need to enter in the size of the wood pieces you have to cut from. I have 6 foot long 1x6's that are $\frac{3}{4}$ " thick so following the same process as used on the Parts, I click on the Piece# 1 in the Material pieces box and then right click on it the bring up the option dialog box and select "Modify selected item ...". I then enter the dimensions of the 1x6 to cut from which is $5\frac{1}{2}$ " wide by 72" long.



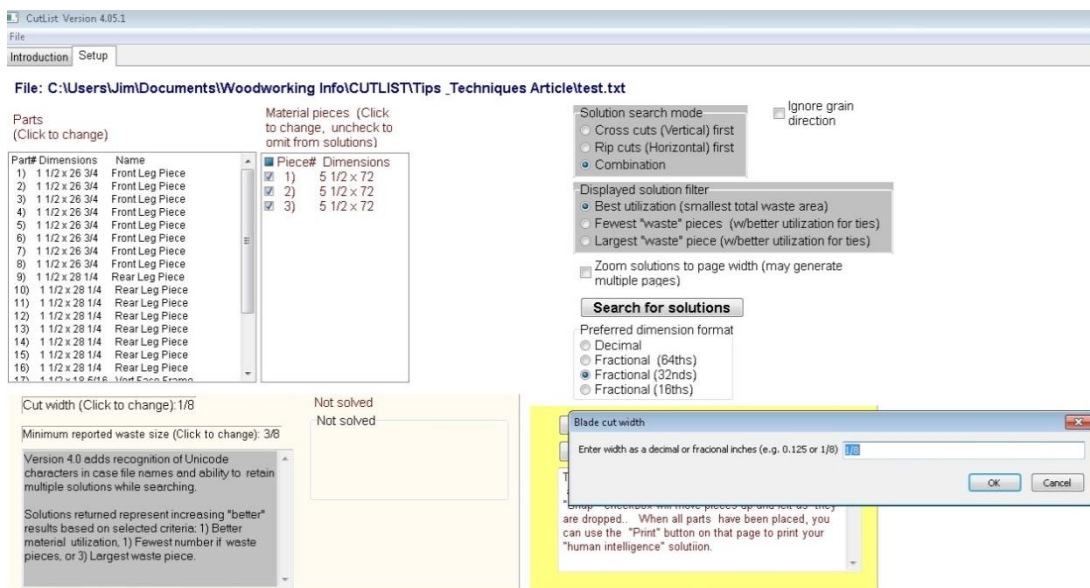
After clicking on "OK", the piece shows up in the Material pieces box.



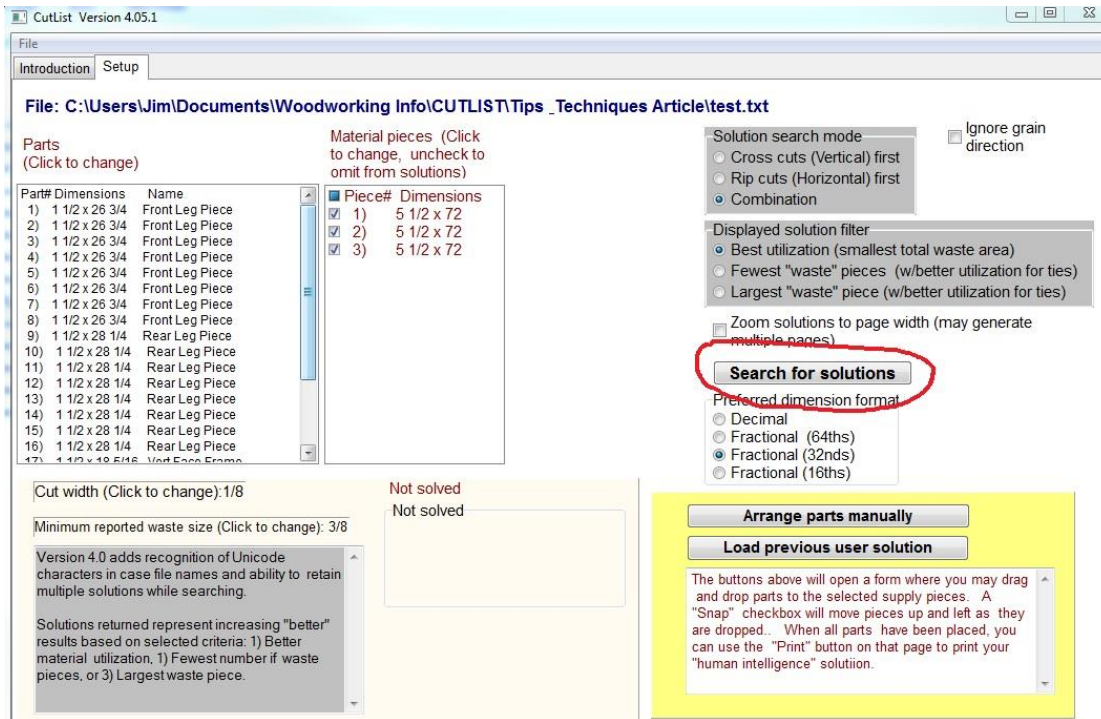
Since I think I need 3 pieces of the 1x6, I then click on the Piece #1 and right click on it to bring up the option dialog box and select “Insert/Duplicate after selected” and add 2 other identical pieces. After doing this, the Material piece list should look like this:



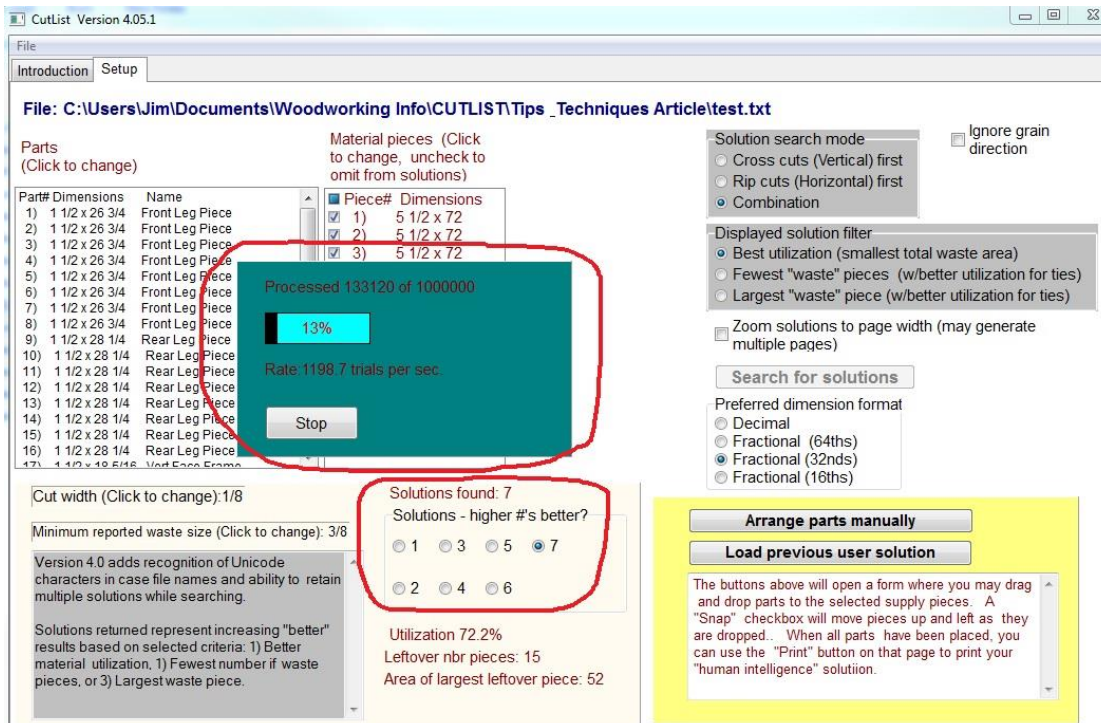
Now, the last thing I need to do is tell the program the thickness (kerf) of the blade I'm using to cut the wood so it can take that into account. Just below the Parts List box is a box that says “Cut width (click to change):”. Click on it and it will ask you to enter is the blade thickness. I entered 1/8” as the thickness of my blade.



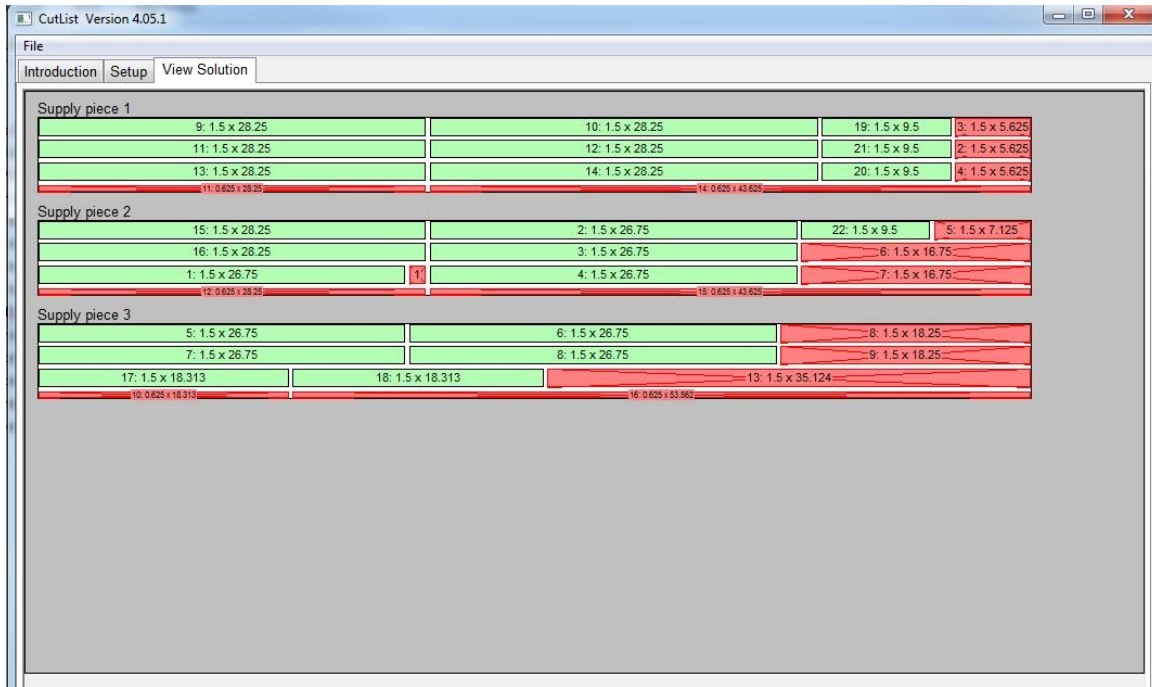
Ok, now I'm ready to run the program to generate a cut list. I click on the "Search for solutions" button



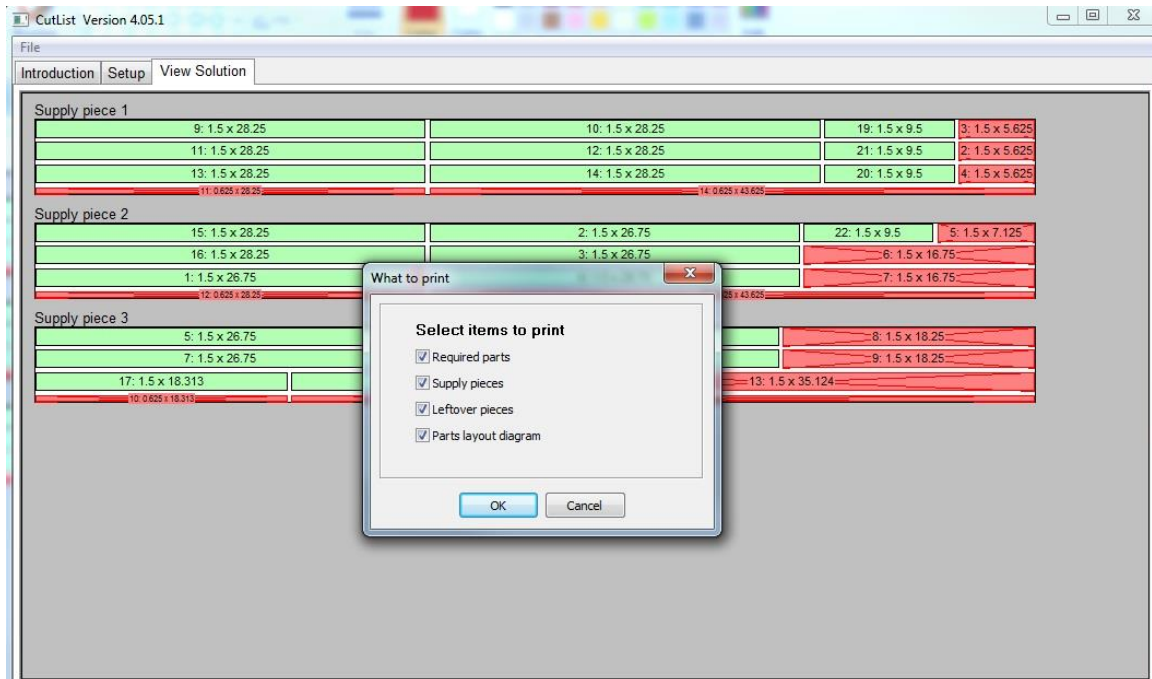
After clicking the button, it will tell you there are many possible ways to cut the parts and you will click the "OK". You will see a progress box showing the % progress and below that box you will start seeing the number of Solutions found.



You can wait until it goes thru all the different combinations or you can click on Stop once you see several solutions. Typically the higher numbered solution is the optimum one. If you click on Stop or you click on the “View Solution” Tab, you will see the selected solution.



If you click on “File” on the Toolbar at the top, you can select “Print” and it will give you several options. I checked all of them to show you what you will get.



Here is what the printout will look like:

Parts List for test.txt

Part#	Dimensions	Name
1)	1 1/2 x 26 3/4	Front Leg Piece
2)	1 1/2 x 26 3/4	Front Leg Piece
3)	1 1/2 x 26 3/4	Front Leg Piece
4)	1 1/2 x 26 3/4	Front Leg Piece
5)	1 1/2 x 26 3/4	Front Leg Piece
6)	1 1/2 x 26 3/4	Front Leg Piece
7)	1 1/2 x 26 3/4	Front Leg Piece
8)	1 1/2 x 26 3/4	Front Leg Piece
9)	1 1/2 x 28 1/4	Rear Leg Piece
10)	1 1/2 x 28 1/4	Rear Leg Piece
11)	1 1/2 x 28 1/4	Rear Leg Piece
12)	1 1/2 x 28 1/4	Rear Leg Piece
13)	1 1/2 x 28 1/4	Rear Leg Piece
14)	1 1/2 x 28 1/4	Rear Leg Piece
15)	1 1/2 x 28 1/4	Rear Leg Piece
16)	1 1/2 x 28 1/4	Rear Leg Piece
17)	1 1/2 x 18 5/16	Vert Face Frame
18)	1 1/2 x 18 5/16	Vert Face Frame
19)	1 1/2 x 9 1/2	Horz Face Frame
20)	1 1/2 x 9 1/2	Horz Face Frame
21)	1 1/2 x 9 1/2	Horz Face Frame
22)	1 1/2 x 9 1/2	Horz Face Frame

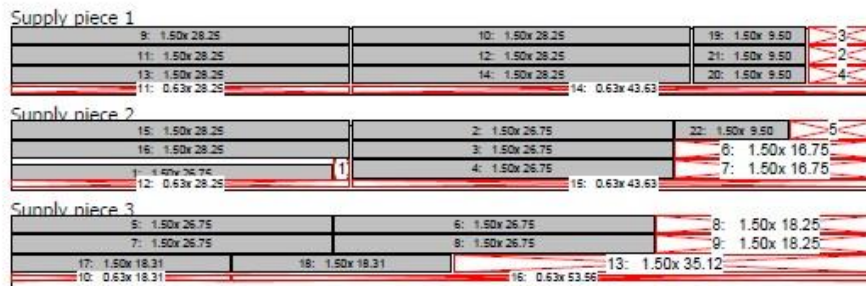
Material List for test.txt

1)	5 1/2 x 72
2)	5 1/2 x 72
3)	5 1/2 x 72

Leftover Pieces List for test.txt

Piece#	Dimensions
1)	1.5 x 1.375
2)	1.5 x 5.625
3)	1.5 x 5.625
4)	1.5 x 5.625
5)	1.5 x 7.125
6)	1.5 x 16.75
7)	1.5 x 16.75
8)	1.5 x 18.25
9)	1.5 x 18.25
10)	0.625 x 18.313
11)	0.625 x 28.25
12)	0.625 x 28.25
13)	1.5 x 35.124
14)	0.625 x 43.625
15)	0.625 x 43.625
16)	0.625 x 53.562

Cutting Diagram Solution 8 for test.txt



I guessed that I needed 3 – 1x6's and it worked out. If I happened to select only 2 – 1x6's it would not have found a solution. If I would have selected more than I needed, like 4 – 1x6's, the solutions would show only 3 pieces of wood being used.

Also, if grain direction is important, you will need to make sure you enter the dimensions of the parts correctly to get the grain running in the right direction. For example, when I enter in the hardwood as my Material pieces, I inputted it as 5 1/2 " wide(vertical) and 72" length (horizontal). Therefore, the grain of the board is running in the length or horizontal direction. Therefore, when you add parts, the grain will always be running in whatever dimension you enter into the length/horizontal input box.

You can save the cutlist by clicking on "File" on the Toolbar at the top and selecting "Save" or "Save As" and then the next time you start the program you can bring up the saved cutlist by using the "Open" command.

I tried to show the basic method to use this program. There are several other options in this program I haven't used but you can experiment with them to see if they are helpful. Good luck!