

Hamilton-Senior lab-off-site learning packet day 6

Instructor Mark Hamilton

Date _____

Program/Class AEM SR

Instructional Objective(s):

Materials:

White board

Method of Instruction:

Research

Activities:

Read through handouts, watch videos and do activities

Answer the questions provided

Closure:

Answer questions on the last page

Assessment:

Answer sheets will be collected and graded.

Objectives:

1. Students will list 3 parts of the program with 80% accuracy.
2. Students will write a simple program with 80% accuracy

Well now, welcome back. I hope you had a great day and are well rested. And above all I hope you are feeling well!!

Well we have talked about the beginning of a program and the end of a program now let's get into the body of the program. I mean you want to know how to write an entire program right. Honestly there are not that many people out there that know how to do this and you are going to be one of the few with this amazing knowledge.

You want to know how to write an entire program, I mean you would just learn like 3 strings on a guitar or only 44 of the 88 keys on a piano right.

You wouldn't learn to be a pilot but skip the part on how to land the plane, I mean well I mean you can't stay up there forever right.

So let's get started.

Objective 1: Explaining the 3 parts of the program.

- Notice that each line has an N number before it. This is the block numbers or sequence of the program. Each line will be performed in the program.
- **N1 through N3** are the startup lines of the program.
 - These lines cancel all canned cycles and set the machine plane being used and also set the work coordinates off-set being used.
- **N4 through N12** is called the body of the program.
 - These lines call up the tool and tool length off-set.
 - These lines also position the tool and start the spindle.
 - Then the remaining lines move the tool around the part.
- **N13 through N15** are the program ending lines.
 - These lines send the machine to the home position in the Z and then the Y axes.
 - Then the M30 ends and resets the program to the beginning.
- So you have the start up.
- The body of the program.
- The ending of the program.

Objective 2: Writing a simple program.

- Some machines will require you to program the following start up lines.
 - G90 G80 G40 ;
 - G00 G49 G17
 - G54 ;
- These start lines will cancel old canned cycles and set the plane being used during the program.
- What is the G54 setting in the program?
 - The G54 set the work coordinates offset to be used in the program.

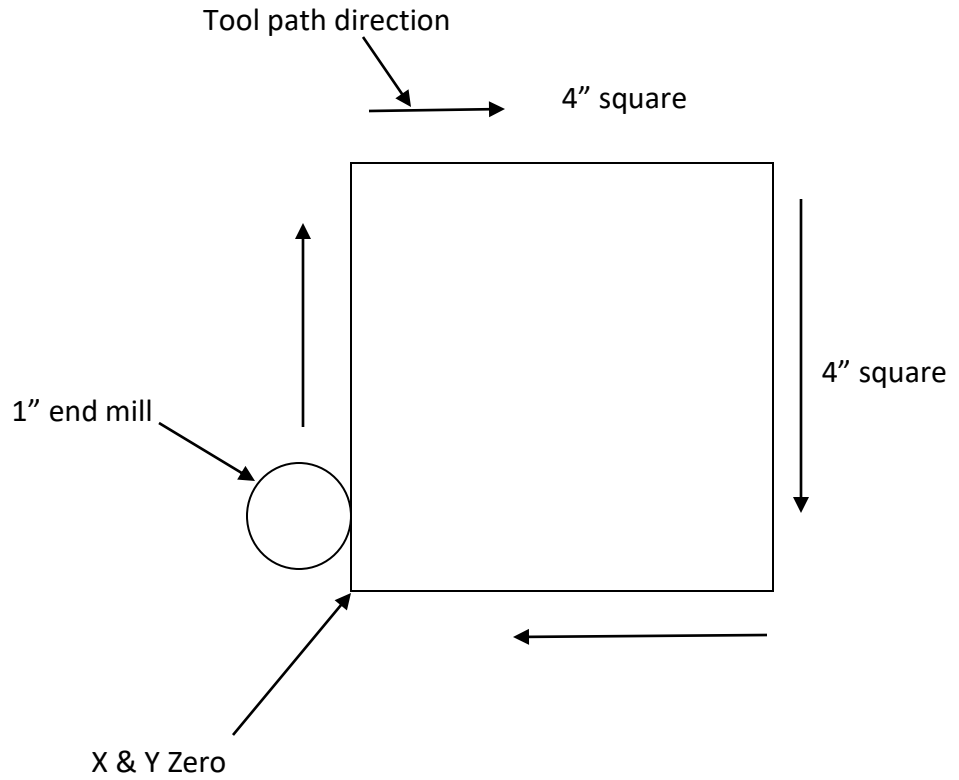
- **The next lines would include the following.**
 - M06 T1 (1.0 DIA end mill) ;
 - G00 X-.5 Y-5.5 ;
 - M03 S800 ;
 - G43 H1 Z.1 M08 ;
- The M06 T1 line calls up the tool being used.
- The G00 positions the table
- The M03 starts the spindle CW at 800 RPMs.
- The G43 calls up the tool length off-set.

- **The next lines would include the following.** (this is the body of the program, the part that cuts)
 - G01 Z-.150 F5.0 ;
 - Y4.5 ;
 - X4.5 ;
 - Y-.5 ;
 - X-1.0 ;
- These lines move the 1" end mill around the part to cut a 4" X 4" square.
- The first line moves the tool down into the part in the Z axis -.150 deep
- The next lines move the cutter around the square to cut the profile of the part.
- **Question:** Why is the tool path at 4.5 if we are cutting a 4" piece?
- Here we go again with the questions.
- So what do you think, why is the tool at 4.5 when we want a 4 inch part?
- Come on you got this, you do this every time you use the manual mill.
- I believe in you!!!!
- Alright are you ready for the answer?
- Wait for it.
- **Answer:** To compensate for the tool radius.

- **The last lines.**
 - G28 Z5.0 ;
 - G28 Y0. ;
 - M30 ;
- These lines send the machine to the home position in the Z axis first then the Y axis.
- Then the M30 ends and resets the program to the beginning.

- **The complete program:**

- N1 G90 G80 G40 ;
- N2 G00 G49 G17
- N3 G54 ;
- N4 M06 T1 (1.0 DIA end mill) ;
- N5 G00 X-.5 Y-5.5 ;
- N6 M03 S800 ;
- N7 G43 H1 Z.1 M08 ;
- N8 G01 Z-.150 F5.0 ;
- N9 Y4.5 ;
- N10 X4.5 ;
- N11 Y-.5 ;
- N12 X-1.0 ;
- N13 G28 Z5.0 ;
- N14 G28 Y0. ;
- N15 M30 ;



Hamilton-Senior lab-off-site learning packet day 6

Page 1

Senior lesson

Name_____

1. What is the purpose of the startup lines in the program?
2. What does the body of the program command the machine to do?
3. What is the purpose of the ending lines in the program?
4. Why are there N numbers at the beginning of each line?
5. In the program above where was the tool positioned in X & Y before it started the Z-.150 move?
6. Try to write a program that cuts a 5" X 5" square using the paper below. Use the same exact format, the only thing you will be changing is the X and Y locations and the X & Y starting point.

Hamilton-Senior lab-off-site learning packet day 6

Page 2

Name _____

Block #	Program
N1	
N2	