

## G&M Codes Overview

- Operate CNC machines
- Began in the form of punch tape
- Developed into computer code in the 1950s

## G&M Today

- Translates human language to machine language
- Typed into computer or generated by a program

## Sample Program Block

N01 M06 T1 ; Change to tool #1

↑      ↑      ↑      ↑  
 line #    tool #    command    comment  
 M06 T1    tool change

N02 M03 S1500

↑      ↑      ↑  
 line #    turn spindle on    Spindle speed: 1500 rpm

## More terminology

An address character is a letter used in G&M code programming to designate a class of functions.

A parameter is an attribute of a feature, such as an dimension, that can be modified.

Word is the programming expression formed when an address is combined with a number.

Block is a single line of code in an NC part program.

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## G-codes: Preparing commands

G00 - Absolute coordinates

G01 - Relative coordinates

G00 - Rapid traverse (non-cutting move)

G01 - Straight line interpolation (cutting move)

G02 - Circular Interpolation (clockwise)

G03 - circular Interpolation (counter clockwise)

G04 - Dwell (wait)

G05 - Pause (wait for user intervention)

## G-codes - Arc commands

Method 1: Arc with  $I$  &  $J$ ; where  $I$  &  $J$  are arc center point coords

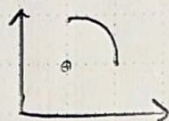
G01 X1 Y2; start

G03 X0 Y-1 I0 J-1

Method 2: Arc with  $R$ ; where  $R$  is radius

G01 X1 Y2; start

G03 X1 Y-1 R1



## Other common G-codes

G20 Inch programming units

G21 millimeter programming units

G80 Cancel cycle cancel

G81 Drilling cycle

G82 Drilling cycle with dwell

## M-Codes

M00 - Pause

M01 - opt. stop

M02 - End of program

M03 - Spindle on

M05 - Spindle off

M06 - tool change

M08/M09 - accessory #1 on/off

M10/M11 - accessory #2 on/off

M30 - program end &amp; reset

M47 - Rewind

## Good recommended practices

Mounted to start position in two lines

First line in  $x-y$  plane, then move in  $z$  axis

Prevents ramping or inadvertent cutting on part

Retract tool out of stock at end of program

Always move faster to safe/unload position end time at end of program

## Your turn

N02    G1    X2.5    Y3    F2  
 ↑    ↑    ↑    ↑    ↑  
 line 2    linear    2.5 on X-axis    3 on y-axis    feedrate of 2 units/min

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