Notes on preparing programs for the Mori Seiki Duraturn lathe ENGR480 2018-09-26

1. Use only UPPER case letters. All lower case letters will be ignored by the control.

2. Begin and end program with '%' character.

3. Second line of program should be Oabcd where abcd is a four digit number.

4. Comments are enclosed in parentheses.

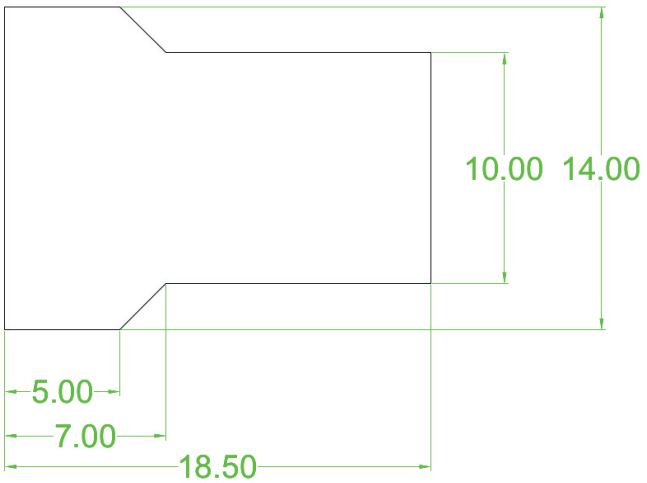
5. All coordinates values must have a decimal point.

6. File must be saved as plain text file (not .doc or other word processor format).

7. Copy file to k:\class\engr\cnc, naming it 'moricode.txt' (do this just before loading it in the lathe).

Assignment for Lab 2018-09-27

Write a program to machine the part below on the Mori Seiki lathe. Use one of the supplied programs as a template. Your program should face the part, rough turn, finish turn, and cutoff the part.



Example of simple cylinder (without variables)

http://engr.wallawalla.edu/engr480 -> examples -> mori -> ex20180926novar.ngc

```
%
O0927; (SIMPLE CYLINDER EXAMPLE 2018-09-26)
; (STOCK- ALUM 0.625IN X 19MM + 10MM)
; (FINISHED PART IS 10.0MM OD X 18.5MM LONG)
; (TOOLS-)
; (T1- CNMG 80DEG DIAMOND)
; (T10- 3.175MM CUTOFF)

; (FACE WITH CNMG)

G00 T0101               (SELECT TOOL 1)
G50 S3000               (MAX SPEED 3000RPM)
G96 S300                (SET CONST SURFACE SPEED)
G99                     (FEED PER REV)
M03                     (TURN ON SPINDLE)
G00 Z18.5               (MOVE TO PLANE OF FACE)
G00 X16.0               (MOVE CLOSE TO STOCK OD)
M08                     (TURN ON COOLANT)
G01 X-0.1 F0.2          (FACE DOWN TO CENTER)
G01 Z19.5 F1.0          (BACK OFF)
M09                     (TURN OFF COOLANT)
M05                     (TURN OFF SPINDLE)
G28 U0 W0               (GO HOME)
M01                     (WAIT FOR START BUTTON)

; (ROUGH TURN OD WITH CNMG)

G00 T0101
G50 S3000
G96 S300
G99
G00 X18.0 Z28.0         (GET CLOSE)
M03
M08
G00 X13.0 Z21.0         (INITIAL POINT)
G01 Z-3.2 F0.2          (PASS 1)
G01 X18.0 F0.2
G00 Z21.0

G00 X11.5
G01 Z-3.2 F0.2          (PASS 2)
G01 X18.0 F0.2
G00 Z21.0

G00 X10.5
G01 Z-3.2 F0.2          (PASS 3)
G01 X40.0 F0.2
G00 Z21.0
M09
M05
G28 U0 W0
M01

; (FINISH TURN WITH CNMG)

G00 T0101
G50 S4000
G96 S300
G99
G00 X18.0 Z28.0         (GET CLOSE)
M03
G00 X13.0 Z21.0         (INITIAL POINT)
M08
G00 X10.0
G01 Z-3.2 F0.05
G01 X18.0 F0.05
G00 Z21.0
M09
M05
G28 U0 W0
M01

; (CUTOFF)

G00 T1010
G50 S1000
G96 S300
G00 Z0.0
G00 X20.0
M03
M08
G01 X-0.4 F0.05
G01 X20.0 F4.0
M09
M05
G28 U0 W0
M30
%
```

Example of simple cylinder (with variables)

http://engr.wallawalla.edu/engr480 -> examples -> mori -> ex20180926vars.ngc

```
%
O0927; (SIMPLE CYLINDER EXAMPLE 2017-09-27)
; (STOCK- ALUM 0.625IN X 19MM + 10MM)
; (FINISHED PART IS 10.0MM OD X 18.5MM LONG)
; (TOOLS-)
; (T1- CNMG 80DEG DIAMOND)
; (T10- 3.175MM CUTOFF)

; (VARIABLES)
#500=15.875  (STOCK DIAM)
#501=18.5    (STOCK LEN)
#502=300.0   (SURFACE M/MIN)
#503=0.2     (ROUGH FEED MM/REV)
#504=0.05    (FINISH FEED MM/REV)
#510=10.0    (FINISH OD)

; (FACE WITH CNMG)

G00 T0101               (SELECT TOOL 1)
G50 S1000               (MAX SPEED 1000RPM)
G96 S#502               (SET CONST SURFACE SPEED)
G99                     (FEED PER REV)
M03                     (TURN ON SPINDLE)
G00 Z#501               (MOVE TO PLANE OF FACE)
G00 X[#500+1.0]         (MOVE CLOSE TO STOCK OD)
M08                     (TURN ON COOLANT)
G01 X-0.1 F#503         (FACE DOWN TO CENTER)
G01 Z[#501+1.0] F1.0    (BACK OFF)
M09                     (TURN OFF COOLANT)
M05                     (TURN OFF SPINDLE)
G28 U0 W0               (GO HOME)
M01                     (WAIT FOR START BUTTON)

; (ROUGH TURN OD WITH CNMG)

G00 T0101
G50 S2000
G96 S#502
G99
G00 X[#500 + 10.0] Z[#501 + 10.0]   (GET CLOSE)
M03
G00 X14.5 Z[#501 + 2.5]           (INITIAL POINT)
M08

G01 Z-3.2 F#503         (PASS 1)
G01 X[#500+2.0] F#503
G00 Z[#501 + 2.5]
G00 X13.0
G01 Z-3.2 F#503         (PASS 2)
G01 X[#500+2.0] F#503
G00 Z[#501 + 2.5]
G00 X11.5
G01 Z-3.2 F#503         (PASS 3)
G01 X[#500+2.0] F#503
G00 Z[#501 + 2.5]
G00 X10.5
G01 Z-3.2 F#503         (PASS 3)
G01 X[#500+2.0] F#503
G00 Z[#501 + 2.5]
M09
M05
G28 U0 W0
M01

; (FINISH TURN WITH VNMG)

G00 T0101
G50 S4000
G96 S#502
G99
G00 X[#500 + 10.0] Z[#501 + 10.0]   (GET CLOSE)
M03
G00 X[#500] Z[#501 + 2.5]           (INITIAL
POINT)
M08
G00 X10.0
G01 Z-3.2 F#504                       (USE FINISH
FEED RATE)
G01 X[#500+2.0] F#503
G00 Z[#501 + 2.5]
M09
M05
G28 U0 W0
M01

; (CUTOFF)

G00 T1010
G50 S1000
G96 S#502
G00 Z0.0
G00 X[#500 + 2.0]
M03
M08
G01 X-0.4 F0.05
G01 X[#500+2.0] F4.0
M09
M05
G28 U0 W0
M30
%
```

Example of simple cylinder (with G71 cycle)

http://engr.wallawalla.edu/engr480 -> examples -> mori -> ex20180926g71.ngc

```
%
O0; (SIMPLE CYLINDER EXAMPLE WITH G71/G70 2018-
09-26)
; (STOCK- ALUM 0.625IN X 19MM + 10MM)
; (FINISHED PART IS 10.0MM OD X 18.5MM LONG)
; (TOOLS-)
; (T1- CNMG 80DEG DIAMOND)
; (T10- 3.175MM CUTOFF)

; (VARIABLES)

(---- SET YOUR STOCK DIAM AND LENGTH HERE ----)

    #500=15.875  (STOCK DIAM)
    #501=18.5    (STOCK LEN)

(---- END STOCK DIAM AND LEN ----)

#502=300.0   (SURFACE M/MIN)
#503=0.2     (ROUGH FEED MM/REV)
#504=0.05    (FINISH FEED MM/REV)
#510=10.0    (FINISH OD)

; (FACE WITH CNMG)
G0 T0101                (SELECT TOOL 1)
G50 S1000               (MAX SPEED 1000RPM)
G96 S#502               (SET CONST SURFACE SPEED)
G99                     (FEED PER REV)
M3                      (TURN ON SPINDLE)
G0 Z#501                (MOVE TO PLANE OF FACE)
G0 X[#500+1.0]          (MOVE CLOSE TO STOCK OD)
M8                      (TURN ON COOLANT)
G1 X-0.1 F#503          (FACE DOWN TO CENTER)
G1 Z[#501+1.0] F1.0     (BACK OFF)
M9                      (TURN OFF COOLANT)
M5                      (TURN OFF SPINDLE)
G28 U0 W0               (GO HOME)
M1                      (WAIT FOR START BUTTON)

; (ROUGH TURN OD WITH CNMG)
G0 T0101
G50 S2000
G96 S#502
G99
G0 X[#500 + 10.0] Z[#501 + 10.0]   (GET CLOSE)
M3
G0 X#500 Z[#501 + 2.0]  (INITIAL POINT)
M8

G71 U2.0 R0.75          (2MM DOC, 0.75MM RETRACT)
G71 P100 Q110 U0.5 W0.25 F#503 (LEAVE 0.5MM ON OD
0.25MM ON FACES)

(---- PUT ROUGHING PROFILES HERE ----)

    N100 G0 X0.0 Z[#501 + 2.0] (START POINT)

         G1 Z#501 F#504
            X10.0
            Z-3.2

    N110 G0 X[#500 + 2.0]      (EXIT)

(---- END ROUGHING PROFILES ----)

M9
M5
G28 U0 W0
M1

; (FINISH TURN WITH CNMG)

G0 T0101
G50 S4000
G96 S#502
G99
G0 X[#500 + 10.0] Z[#501 + 10.0] (GET CLOSE)
M3
G0 X#500 Z[#501 + 2.5]           (INITIAL POINT)
M8

G70 P100 Q110   (EXACT PROFILE FOR FINISH)

M9
M5
G28 U0 W0
M0

; (CUTOFF - DON'T CHANGE ANYTHING HERE)

G0 T1010
G50 S1000
G96 S#502
G0 Z0.0
G0 X[#500 + 2.0]
M3
M8
G1 X-0.4 F0.05
G1 X[#500+2.0] F4.0
M9
M5
G28 U0 W0
M30
%
```