Assignment #3 – Spindle Speed Calculator

Overview

In this assignment, you will develop a spindle speed calculator to create a table of required spindle rpm values for a range of stock diameters and cutting speeds. You will use Controls that will simplify error checking code and make the display user friendly.

This assignment must be done individually, and it is worth 5% of the course grade.

Design and Coding

1. Task Analysis and Program Design
   1) Reinforce the "IPOD" model to develop this program.
   2) The spindle speed equation is given by

$$N = \frac{12 \times v}{\pi \times D}$$

   where N is spindle speed in revolutions per minute (rpm)
   v is cutting speed in feet per minute (ft/min)
   D is stock diameter in inches

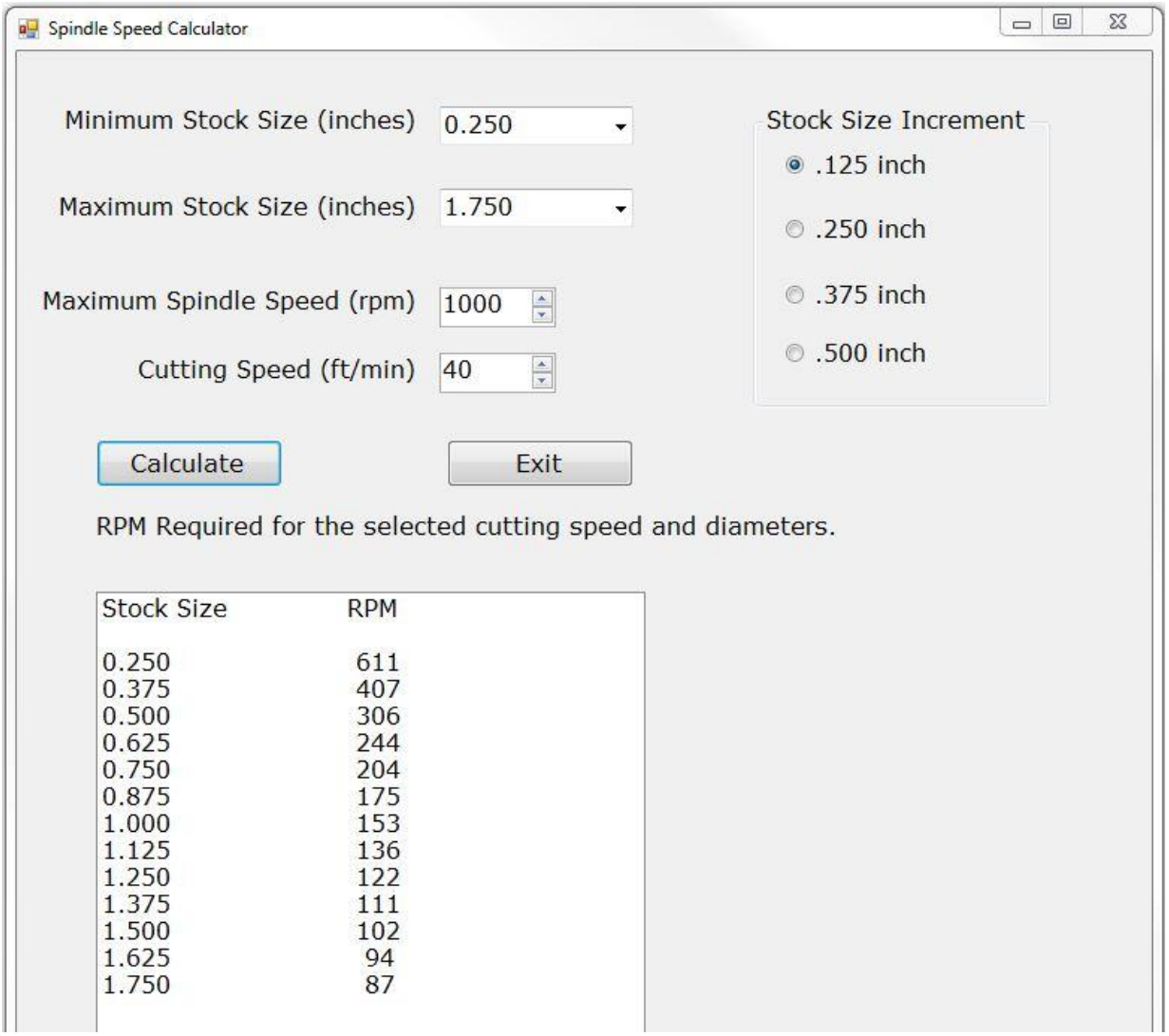
   3) In order to minimize any input errors, user selection Controls are utilized.
      - Spindle speeds are calculated and listed, based on the stock size increments. A group box with 4 radio buttons is set up for .125", .250", .375", and .500" increments, to be selected by the user.
      - Two combo boxes, one for minimum stock diameter, and the other for maximum stock diameter. All stock diameters are pre-filled, ranging from .250" through 4.000" in .250" increments.
        ➔ 2 labels are also included here as identifiers.
      - The minimum and maximum stock diameters are to limit the options for speed calculations. Note that the calculation must begin at the minimum stock size, and end at the maximum stock size.
      - A NumericUpDown Control is used to adjust the maximum allowed spindle speed, and must set its allowable range from 500rpm to 5,000rpm with an increment of 100rpm.
        ➔ A label is also included here as an identifier.
      - Cutting speeds are also to be selected from another NumericUpDown, which its range is set from 40ft/min to 160ft/min with an increment of 20ft/min.
      - The results of speed calculation are tabulated in a table (as shown below), which consists of two columns. The left column lists the stock sizes that are determined by the above user selection Controls, while the right columns lists the corresponding calculated spindle speed.
      - Any spindle speed that exceeds the max speed set by the NumericUpDown Control will not display its numeric speed value, but show "OVER MAX" instead.
      - The calculation is initiated when a 'Calculate' button is pressed.
      - The program is ended when an 'Exit' button is pressed.

2. Launch Visual Studio 2019 and create a Visual Basic Windows Forms App (.NET Framework).
   1) Project Name: **A3_SpindleSpeed_YourCollegeUsername**
      - Your College username is the username you use to log into eConestoga.
   2) Project Location: your Visual Studio 2019 projects folder on your College OneDrive

3. Based on the task analysis, design a GUI to include the following controls with property settings:

CONTROL	PROPERTY	SETTING
Form1	Text FormBorderStyle StartPosition	Spindle Speed Calculator FixedToolWindow CenterScreen
Group Box1	Text	Stock Size Increment
Radio Button1	(Name) Text	rad125 .125 inch
Radio Button2	(Name) Text	rad250 .250 inch
Radio Button3	(Name) Text	rad375 .375 inch
Radio Button4	(Name) Text	rad500 .500 inch
Combo Box1	(Name) DropDownStyle	cboMinStockSize DropDownList
Label1	Text	Minimum Stock Size (inches)
Combo Box2	(Name) DropDownStyle	cboMaxStockSize DropDownList
Label2	Text	Maximum Stock Size (inches)
NumericUpDown1	(Name) Value Increment Min / Max	nudMaxAllowedSpeed 1000 100 500 – 5000
Label3	Text	Maximum Spindle Speed (rpm)
NumericUpDown2	(Name) Value Increment Min / Max	nudCuttingSpeed 40 20 40 – 160
Label4	Text	Cutting Speed (ft/min)
ListBox1	(Name)	LstResults
Button1	(Name) Text	btnCalculate Calculate
Button2	(Name) Text	btnExit Exit

Here is a sample GUI with calculated spindle speeds at selected input parameters.



Assignment Submissions

You need to submit a PDF file of your source code with a title page, as well as uploading the zipped file of your VB project to Assignment #3 dropbox.

a. For the PDF file, you must include your **full name**, course number, course name, etc. on the title page and on the FIRST line of your source code, as a comment.

b. For the zipped file, refer to Tutorial #04 (available in Week 04 syllabus) on how to compress a Visual Basic 2019 project for the detailed instructions.

   i. The due date of Assignment #3 is shown on eConestoga. Both files must be submitted by the due date – **late submission will NOT be accepted**.