

Lecture 17 - Programming with Excel

* Prayer / spiritual thought

* announcement

* Unit of the day :

$$1 \text{ gal} = 3.785 \text{ L}$$

(a liter is a little more than a quart)

I. Macros and VBA.

* Sometimes you want to automate a task.

In Excel you can do this by recording a Macro

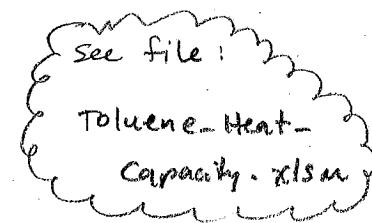
* Enable Macros :

- File \rightarrow Options \rightarrow Customize Ribbon \rightarrow Developer

- Save sheet as a .xlsm (macro-enabled workbook)

Example

- Record a macro to format a table.
- Show how to record & run the macro.



* Macros are actually computer-written code in a language called "Visual Basic for Applications" or VBA for short.

(Visual Basic is a programming language written and maintained by Microsoft. VBA is a form of Visual Basic used for writing macros inside office applications.)

- * VBA code can be accessed from the developer ribbon
 - ↳ "Visual Basic" button
- * VBA code can also be accessed by "editing" a macro.
- * VBA is a programming language, like Python, and it can be used to write subroutines / macros and Excel functions. This makes Excel much more powerful!

* Elements of VBA language

- See handout:

- comments
- variables
- conditionals
- arrays
- loops
- subroutines
- functions

Briefly cover the handout.

→ Expect students will be familiar with where to go to learn more about VBA.

Example

- Use trapezoidal rule to do a quadrature of the $C_p(T)$ data to find an enthalpy
- write a "trapz" function to do this.

see file:

Toluene - Heat
- Capacity .xlsm

II. Excel and Python

- * Sometimes you have something that is hard to do in Excel or Python alone.
- * The "xlwings" module allows one to interface the two.

* xlwings basics

- see handout:

- import xlwings
- get/push data from/to Excel from Python
- manipulating arrays
- plots

* running python from VBA.

Example:

- Fit a cubic spline to the heat capacity data
- Make a plot & import it to Excel.
- Write a subroutine to use a spline
from python to interpolate a data point.

See file:
Toluene -
Heat -
Capacity.xlsx