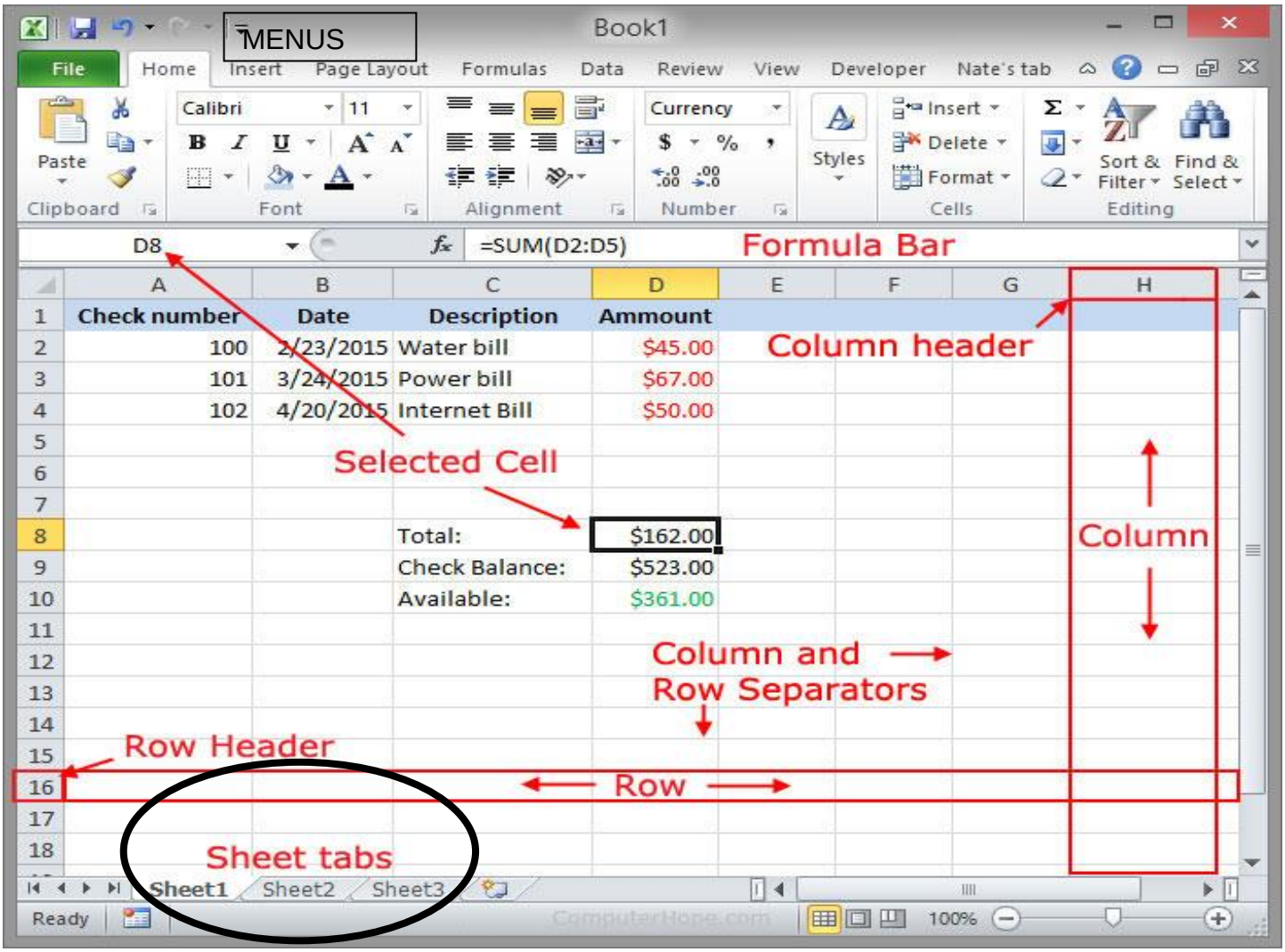
Lesson 3 and 4 Workbook and Worksheet
Teacher : Mrs. Mary Grace SJ. Rafael

- Concepts

Workbook and Worksheet

In Microsoft Excel, a **workbook** is a collection of one or more spreadsheets, also called **worksheets**, in a single file. Below is an example of a spreadsheet called "Sheet1" in an Excel workbook file called "Book1." Our example also has the "Sheet2" and "Sheet3" sheet tabs, which are also part of the same workbook.



	A	B	C	D	E	F	G	H
1	Check number	Date	Description	Ammount				
2	100	2/23/2015	Water bill	$45.00				
3	101	3/24/2015	Power bill	$67.00				
4	102	4/20/2015	Internet Bill	$50.00				
5								
6								
7								
8			Total:	$162.00				
9			Check Balance:	$523.00				
10			Available:	$361.00				
11								
12								
13								
14								
15								
16								
17								
18								

The main concepts are those of a grid of cells, called sheet, with either raw data, called values, or formulas in the cells. Formulas say how to mechanically compute new values from existing values. Values are generally numbers, but can be also pure text, dates, months, etc. Extensions of these concepts include logical spreadsheets. Various tools for programming sheets, visualizing data, remotely connecting sheets, displaying cells dependencies, etc. are commonly provided.

✓ Cells

A "cell" can be thought of as a box for holding data. A single cell is usually referenced by its column and row (A2 would represent the cell below containing the value 10). Usually rows, representing the dependant variables, are referenced in decimal notation starting from 1, while columns representing the independent variables use 26-adic bijective numeration using the letters A-Z as numerals. Its physical size can usually be tailored for its content by dragging its height or width at box intersections (or for entire columns or rows by dragging the column or rows headers).

My Spreadsheet				
	A	**B**	**C**	**D**
01	**value1**	**value2**	**added**	**multiplied**
02	**10**	**20**	**30**	**200**

An array of cells is called a *sheet* or *worksheet*. It is analogous to an array of variables in a conventional computer program (although certain unchanging values, once entered, could be considered, by the same analogy, constants). In most implementations, many worksheets may be located within a single spreadsheet. A worksheet is simply a subset of the spreadsheet divided for the sake of clarity. Functionally, the spreadsheet operates as a whole and all cells operate as global variables within the spreadsheet ('read' access only except its own containing cell).

A cell may contain a value or a formula, or it may simply be left empty. By convention, formulas usually begin with **=** sign.

▪ Values

A value can be entered from the computer keyboard by directly typing into the cell itself. Alternatively, a value can be based on a formula (see below), which might perform a calculation, display the current date or time, or retrieve external data such as a stock quote or a database value.

• The Spreadsheet Value Rule

Computer scientist Alan Kay used the term *value rule* to summarize a spreadsheet's operation: a cell's value relies solely on the formula the user has typed into the cell. The formula may rely on the value of other cells, but those cells are likewise restricted to user-entered data or formulas. There are no 'side effects' to calculating a formula: the only output is to display the calculated result inside its occupying cell. There is no natural mechanism for permanently modifying the contents of a cell unless the user manually modifies the cell's contents. In the context of programming languages, this yields a limited form of first-order functional programming.

- Data Format

A cell or range can optionally be defined to specify how the value is displayed. The default display format is usually set by its initial content if not specifically previously set, so that for example "31/12/2007" or "31 Dec 2007" would default to the cell format of *date*. Similarly adding a % sign after a numeric value would tag the cell as a percentage cell format. The cell contents are not changed by this format, only the displayed value.

Some cell formats such as "numeric" or "currency" can also specify the number of decimal places.

This can allow invalid operations (such as doing multiplication on a cell containing a date), resulting in illogical results without an appropriate warning.

- Cell Formatting

Depending on the capability of the spreadsheet application, each cell (like its counterpart the "style" in a word processor) can be separately formatted using the attributes of either the content (point size, color, bold or italic) or the cell (border thickness, background shading, color). To aid the readability of a spreadsheet, cell formatting may be conditionally applied to data; for example, a negative number may be displayed in red.

A cell's formatting does not typically affect its content and depending on how cells are referenced or copied to other worksheets or applications, the formatting may not be carried with the content.

- Named Cell

In most implementations, a cell, or group of cells in a column or row, can be "named" enabling the user to refer to those cells by a name rather than by a grid reference. Names must be unique within the spreadsheet, but when using multiple sheets in a spreadsheet file, an identically named cell range on each sheet can be used if it is distinguished by adding the sheet name. One reason for this usage is for creating or running macros that repeat a command across many sheets. Another reason is that formulas with named variables are readily checked against the algebra they are intended to implement (they resemble Fortran expressions). Use of named variables and named functions also makes the spreadsheet structure more transparent.

- Cell Reference

In place of a named cell, an alternative approach is to use a cell (or grid) reference. Most cell references indicate another cell in the same spreadsheet, but a cell reference can also refer to a cell in a different sheet within the same spreadsheet, or (depending on the implementation) to a cell in another spreadsheet entirely, or to a value from a remote application.

A typical **cell reference** in "A1" style consists of one or two case-insensitive letters to identify the column (if there are up to 256 columns: A–Z and AA–IV) followed by a row number (e.g. in the range 1–65536). Either part can be relative (it changes when the formula it is in is moved or copied), or absolute (indicated with $ in front of the part concerned of the cell reference). The alternative "R1C1" reference style consists of the letter R, the row number, the letter C, and the column number; relative row or column numbers are indicated by enclosing the number in square brackets. Most current spreadsheets use the A1 style, some providing the R1C1 style as a compatibility option.

When the computer calculates a formula in one cell to update the displayed value of that cell, cell reference(s) in that cell, naming some other cell(s), cause the computer to fetch the value of the named cell(s).

A cell on the same "sheet" is usually addressed as:

```
=A1
```

A cell on a different sheet of the same spreadsheet is usually addressed as:

```
=SHEET2!A1              (that is; the first cell in sheet 2 of same
spreadsheet).
```

Some spreadsheet implementations allow a cell references to another spreadsheet (not the current open and active file) on the same computer or a local network. It may also refer to a cell in another open and active spreadsheet on the same computer or network that is defined as shareable. These references

A circular reference occurs when the formula in one cell refers—directly, or indirectly through a chain of cell references—to another cell that refers back to the first cell. Many common errors cause circular references. However, some valid techniques use circular references. These techniques, after many spreadsheet recalculations, (usually) converge on the correct values for those cells.

- Cell Ranges

Likewise, instead of using a named range of cells, a range reference can be used. **Reference to a range of cells is typically of the form (A1:A6), which specifies all the cells in the range A1 through to A6**. A formula such as "=SUM(A1:A6)" would add all the cells specified and put the result in the cell containing the formula itself.

✓ Sheets

In the earliest spreadsheets, cells were a simple two-dimensional grid. Over time, the model has expanded to include a third dimension, and in some cases a series of named grids, called sheets. The most advanced examples allow inversion and rotation operations which can slice and project the data set in various ways.

✓ Formulas

A formula identifies the calculation needed to place the result in the cell it is contained within. A cell containing a formula therefore has two display components; the formula itself and the resulting value. The formula is normally only shown when the cell is selected by "clicking" the mouse over a particular cell; otherwise it contains the result of the calculation.

A formula assigns values to a cell or range of cells, and typically has the format:

```
=expression
```

where the expression consists of:

- values, such as 2, 9.14 or 6.67E-11;
- references to other cells, such as, e.g., A1 for a single cell or B1:B3 for a range;

- arithmetic operators, such as +, -, *, /, and others;
- relational operators, such as >=, <, and others; and,
- functions, such as SUM(), TAN(), and many others.

When a cell contains a formula, it often contains **references to other cells**. Such a **cell reference is a type of variable**. Its value is the value of the referenced cell or some derivation of it. If that cell in turn references other cells, the value depends on the values of those. References can be relative (e.g., A1, or B1:B3), absolute (e.g., $A$1, or $B$1:$B$3) or mixed row– or column-wise absolute/relative (e.g., $A1 is column-wise absolute and A$1 is row-wise absolute).

The available options for valid formulas depends on the particular spreadsheet implementation but, in general, most arithmetic operations and quite complex nested conditional operations can be performed by most of today's commercial spreadsheets. Modern implementations also offer functions to access custom-build functions, remote data, and applications.

A formula may contain a condition (or nested conditions)—with or without an actual calculation—and is sometimes used purely to identify and **highlight errors**. In the example below, it is assumed the sum of a column of percentages (A1 through A6) is tested for validity and an explicit message put into the adjacent right-hand cell.

```
=IF(SUM(A1:A6) > 100, "More than 100%", SUM(A1:A6))
```

A spreadsheet does not, in fact, have to contain any formulas at all, in which case it could be considered merely a collection of data arranged in rows and columns (a database) like a calendar, timetable or simple list. Because of its ease of use, formatting and hyperlinking capabilities, many spreadsheets are used solely for this purpose.

✓ Functions

Source: www.en.wikipedia.org
https://www.computerhope.com/jargon/w/workbook.htm

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Identify:

1. This can be thought of as a box for holding data. It is the intersection of a row and a column.

2. This is a horizontal line of cells, usually referenced in decimal notation starting from 1.

3. This is a vertical stack of cells, usually referenced by letters A to Z and combinations of these.

4. This is a collection of selected cells, denoted by the cell address of the top leftmost cell and the address of the bottom rightmost cell, for example, “E2:F15”.

5. This is the array of cells from A1 all the way to the bottom rightmost cell.

6. This is the collection of worksheets.

7. This consists of one or two case-insensitive letters to identify the column (if there are up to 256 columns: A–Z and AA–IV) followed by a row number (e.g. in the range 1–65536), for example, “A1”.

8. This occurs when the formula in one cell refers—directly, or indirectly through a chain of cell references—to another cell that refers back to the first cell.

9. This identifies the calculation needed to place the result in the cell it is contained within, for example, “=SUM(E2:F15)”.

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Type the following in Worksheet 1 15 Points
Instructions:

1. Save you file to your folder in Drive D or My Documents 2 Pt
2. Save your file under the filename Exercise3+yoursuname 2 Pt
3. Heading : Font : Calibri 14 , Bold, Color : Green 3 Pts
4. Subheading : Start from Row no4 Column A Same Font : Color Black 3 Pts
5. Type at least 5 data in your worksheet 5 Pts

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	Name	Surname	Age	Course and Year	Section
1.					
2.					
3.					
4.					
5.					

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Lesson 4

Concepts

FORMULA AND FUNCTIONS
A formula is an expression which calculates the value of a cell. Functions are predefined formulas and are already available in Excel.

For example, cell A3 below contains a formula which adds the value of cell A2 to the value of cell A1.

For example, cell A3 below contains the SUM function which calculates the sum of the range A1:A2.

Enter a Formula
To enter a formula, execute the following steps.
1. Select a cell.
2. To let Excel know that you want to enter a formula, type an equal sign (=).
3. For example, type the formula A1+A2.

Tip: instead of typing A1 and A2, simply select cell A1 and cell A2.
4. Change the value of cell A1 to 3.

Excel automatically recalculates the value of cell A3. This is one of Excel's most powerful features!
Edit a Formula
When you select a cell, Excel shows the value or formula of the cell in the formula bar.

1. To edit a formula, click in the formula bar and change the formula.

2. Press Enter.

Operator Precedence
Excel uses a default order in which calculations occur. If a part of the formula is in parentheses, that part will be calculated first. It then performs multiplication or division calculations. Once this is complete, Excel will add and subtract the remainder of your formula. See the example below.

First, Excel performs multiplication (A1 * A2). Next, Excel adds the value of cell A3 to this result.
Another example,

First, Excel calculates the part in parentheses (A2+A3). Next, it multiplies this result by the value of cell A1.

Copy/Paste a Formula
When you copy a formula, Excel automatically adjusts the cell references for each new cell the formula is copied to. To understand this, execute the following steps.
1. Enter the formula shown below into cell A4.

2a. Select cell A4, right click, and then click Copy (or press CTRL + c)...

...next, select cell B4, right click, and then click Paste under 'Paste Options:' (or press CTRL + v).

2b. You can also drag the formula to cell B4. Select cell A4, click on the lower right corner of cell A4 and drag it across to cell B4. This is much easier and gives the exact same result!

Result. The formula in cell B4 references the values in column B.

The Average:
If you want to get the average of a certain data use
=average(a1..target cells) . This is also usful in getting the mean when you are doing research.
The VlookUp
Use VLOOKUP when you need to find things in a table or a range by row. For example, look up a price of an automotive part by the part number, or find an employee name based on their employee ID.
Tip: Check out these YouTube videos from Excel community experts for more help with VLOOKU
There are four pieces of information that you will need in order to build the VLOOKUP syntax:
1.The value you want to look up, also called the lookup value.
2. The range where the lookup value is located. Remember that the lookup value should always be in the first column in the range for VLOOKUP to work correctly. For example, if your lookup value is in cell C2 then your range should start with C.
3. The column number in the range that contains the return value. For example, if you specify B2:D11 as the range, you should count B as the first column, C as the second, and so on.
4. Optionally, you can specify TRUE if you want an approximate match or FALSE if you want an exact match of the return value. If you don't specify anything, the default value will always be TRUE or approximate match.
Now put all of the above together as follows:
=VLOOKUP(lookup value, range containing the lookup value, the column number in the range containing the return value, Approximate match (TRUE) or Exact match (FALSE)).

Refernces
https://support.office.com/en-us/article/vlookup-function-0bbc8083-26fe-4963-8ab8-93a18ad188a1
https://www.excel-easy.com/introduction/formulas-functions.html

Activity 4

Type the following in Worksheet 1 40 Points
Instructions:

1. Save you file to your folder on Drive D or My Documents 2 Pt
2. Save your file under the filename Exercise4+yoursuname 2 Pt
3. Heading : Font : Calibri 14 , Bold, Color : Green 3 Pts
4. Subheading : Start from Row no4 Column A Same Font : Color Black 3 Pts
5. Type at least 5 data in your worksheet from to deduction 20 pts
6. Formula for Net Pay : Salary less Deduction 5 pts
7. Total Each column of Salary, Deduction and Net pay using Add Sum 5 Pts

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Name	Surname	Salary	Deduction	Net Pay
Total				

II. Average the following Attendance Data Info of SHS : 25 points

Item	1st quarter	2nd quater	3rd Quarter	Average
Grade 11 GAS	45	40	40	
Grade 11 ABM	25	20	20	
Grade 12 GAS	40	35	33	
Grade 12 ABM	35	33	30	
ToTal				

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Name Surname Salary Deduction Net Pay

Total

II. **Average the following Attendance Data Info of SHS : 25 points**

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ToTal					

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