Introduction to FinTech using Excel
In an R-assisted Learning Environment

Amazon link: http://datayyy.com/webs/finTechAmazon.html
Springer Link: https://link.springer.com/book/9783031897788
ISBN Paperback : 978-3-031-89781-8
eBook : 978-3-031-89779-5
Hhardcover: 978-3-031-89778-8
GitHub link: https://github.com/paulyxy/Introduction-to-FinTech-using-Excel

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End of chapter problems

Chapter 15: Term Projects (online materials)

```
> .chapter15
function(i=0){
"i  Chapter 15: Term Projects       i  Projects
 -  ----------------------------  --  ----------------------------
 1  Requirements                  21  Unsupervised learning 1
 2  'Data analysis' not available 22    :2
 3  'VBA' is not available        23    :3
 4  Blockchain: template 1        24    :4
 5            : template 2        25    :5
 6     :3 transaction data        26 Supervised learning
 7     :4                         27    : Retirement calculator
 8     :5                         28    : CAPM, FF3, FFC4, or FF5?
 9     :6                         29    : Test of the January Effect
10     :7                         30    : Bankruptcy prediction: Z-score
11  Public/private keys           31  Neural Network 1
12     :2                         32    :2
13     :3                         33    :3
14     :4                         34    :4
15  Signature 1                   35    :5
16     :2                         36 Smart contract 1
17     :3                         37    :2
18     :4                         38    :3
19  Videos                        39    :4
20  Links                         40  Topics taken already (updated on mm/dd/yyyy)

 Example 1:>.c15     # see the above list
 Example 2:>.c15()   # see the above list
 Example 3:>.c15(1)  # see the first explanation
```

Chapter 16: R Installation and Basics

```
> .chapter16
function(i=0){
" i  Chapter 16: R basics (optional)           i  Value Assignment and simple Functions
  -  ------------------------------------     --  ------------------------------------
  1  Download and install R                   21  Assignment without defining it
  2  Launch/quit R, one line for this course  22  Three ways to assign a value
  3  Comment line and comment paragraph       23  Upper and down arrow keys
  4  3 ways to assign a value/values          24  One benefit of -> assignment
  5  Use the up and down arrow keys           25  String variable
  6  R is case sensitive                      26  typeof() function
  7  Normal operations: +, -, /, ^ (power)    27  x<-c(1,10)
  8  listing function ls()                    28  .nLetterFunctions
  9  remove a variable or several variables   29  scan() function
 10  remove all variables                     30  x=1:100
 11  use meaningful variable names            31  seq() function
 12  current working directory                32  read.table('clipboard')
 13  head() and tail() functions              33  help(read.table)
 14  mean() and sd()                          34  readline() function
 15  put several commands on one line         35  mean() and sd() functions
 16  The simplest function                    36  other embedded functions
 17  use .nLetterFunctions()                  37  Precision of R
 18  use the help()  function                 38  .Machine
 19  Videos
 20  Links

 Example #1:>.c16    # see the above list
 Example #2:>.c16()  # same as the above
 Example #3:>.c16(1) # see the first explanation
```

Chapter 17: Excel Macro (optional and online materials)

```
> .chapter17
function(i=0){
"i  Chapter 17: Simple Macros    i   Explanation                              i    Introduction to FinTech
 -  ----------------------------  --  -----------------------------------      --  ----------------
 1  Developer not available      21  Macro 4 cleaning                         41   increase H4'value by 1
 2  Record the simplest Macro    22  Macro 4 hiding   columns                 42   calculate letter frequencies
 3  How to run a Marco?          23  Macro 4 unhiding columns                 43   Rotate Rotor #1
 4  How to edit a macro          24  Macro 4 hiding   rows                    44
 5  A simple macro               25  Macro 4 unhiding rows                    45
 6  Recording short-cut: Ctrl-a  26  Macro 4 creating a pie                    46
 7  Assign a shortcut key        27  Macro 4 adding 10
 8  Message box: Hello World!    28  Macro 4 copying from one cell to another
 9  Copy others macros           29  Macro 4 copying to current cell
10  Ctrl-d to clean              30  Macro 4 generating five 9
11  Ctrl-h to hide               31  Macro 4 generating 1,3, 5, ...,
12  Ctrl-u to unhide             32  Macro 4 double loops
13  Extension should be *.xlsm   33  Macro 4 assigning z to (x,y): x,y,z in A1,A2,A3
14  Link a button to a Macro     34  Macro 4 printing a mutiple-line message box
15  call Macros from a Macro     35  Macro 4 printing your instruction
16  If left cell empty-> Done    36  Macro 4 (input box and save to A1)
17  Move 1 cell to the right     37  Macro 4 deleting the range of A1:Z100
18  Move down/up/right/left      38  Macro 4 unhide 1st column/1st row
19  A set of one-line commands   39  Macro 4 add_row_column (Binomial tree option model)
20  Links                        40  Macro 4 clean (Binomial tree option model)

 Example #1:>.c17    # see the above list
 Example #2:>.c17()  # the same as the above
 Example #3:>.c17(1) # see the 1st explanation
```

Chapter 18: Excel VBA (optional and online materials)

```
> .chapter18
function(i=0){
" i  Chapter 18: Simple VBAs                          i    Descriptin                      i   Description
  -  ---------------------------------------------   -- --------------------              --  -------------
  1 VBA If 'Developer' is not available               26 VBA 4 finding duplicates (2)      51 VBA 4 Sortino ratio
  2 VBA How to copy-and-paste other's VBA?            27 VBA 4 freqGivenNumber             52 VBA 4 todayPrice()
  3 VBA After you copy and paste other's VBA          28 VBA 4 fvGrowingAnnuity            53 VBA 4 varGivenProb
  4 VBA 4 APR2APR                                     29 VBA 4 fvNoSign() function
  5 VBA 4 APR2effect                                  30 VBA 4 generating a var-cov matrix
  6 VBA 4 Black-Scholes-Merton call option            31 VBA 4 geomeanYan() geomean 4 ret
  7 VBA 4 Black-Scholes-Merton put (no dividend)      32 VBA 4 Linear reg: T,R,E
  8 VBA 4 Black pricing European options on futures   33 VBA 4 Linear reg:T,R,E
  9 VBA 4 bond bond price                             34 VBA 4 links
 10 VBA 4 bond convexity                              35 VBA 4 LPSD
 11 VBA 4 Bond duration                               36 VBA 4 meanGivenProb
 12 VBA 4 Cholesky decomposition                      37 VBA 4 Modified duration
 13 VBA 4 converting 23.23 to words                   38 VBA 4 noRepeats
 14 VBA 4 converting miles to km                      39 VBA 4 npvTrue()/npvYan() functions
 15 VBA 4 doubling an input value                     40 VBA 4 others
 16 VBA 4 downloading several years' fin statements   41 VBA 4 payback period
 17 VBA 4 durationYan                                 42 VBA 4 pGivenT_1sided()
 18 VBA 4 DW test (Durin-Watson autocorrelation test) 43 VBA 4 pGivenT2sided()
 19 VBA 4 EAR (Effective Annual Rate)                 44 VBA 4 pv of growing perpeturity
 20 VBA 4 effective rate conversion: EFFECTyan()      45 VBA 4 pvGrowingAnnuity
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 23 VBA 4 estimating the area                         48 VBA 4 removing errors
 24 VBA 4 financial statements (2)                    49 VBA 4 secondHighestValue
 25 VBA 4 finding duplicates                          50 VBA 4 showFormula() function

 Example #1:>.c18     # find out the above list
 Example #2:>.c18()   # the same as the above
 Example #3:>.c18(1)  # see the first explanation
```