The Windows PowerShell Language

Using Variables with Windows PowerShell

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Welcome

This is the next step in your PowerShell journey

Running basic and simple commands is the first step

Learn the language to do more

You need to master language elements to script

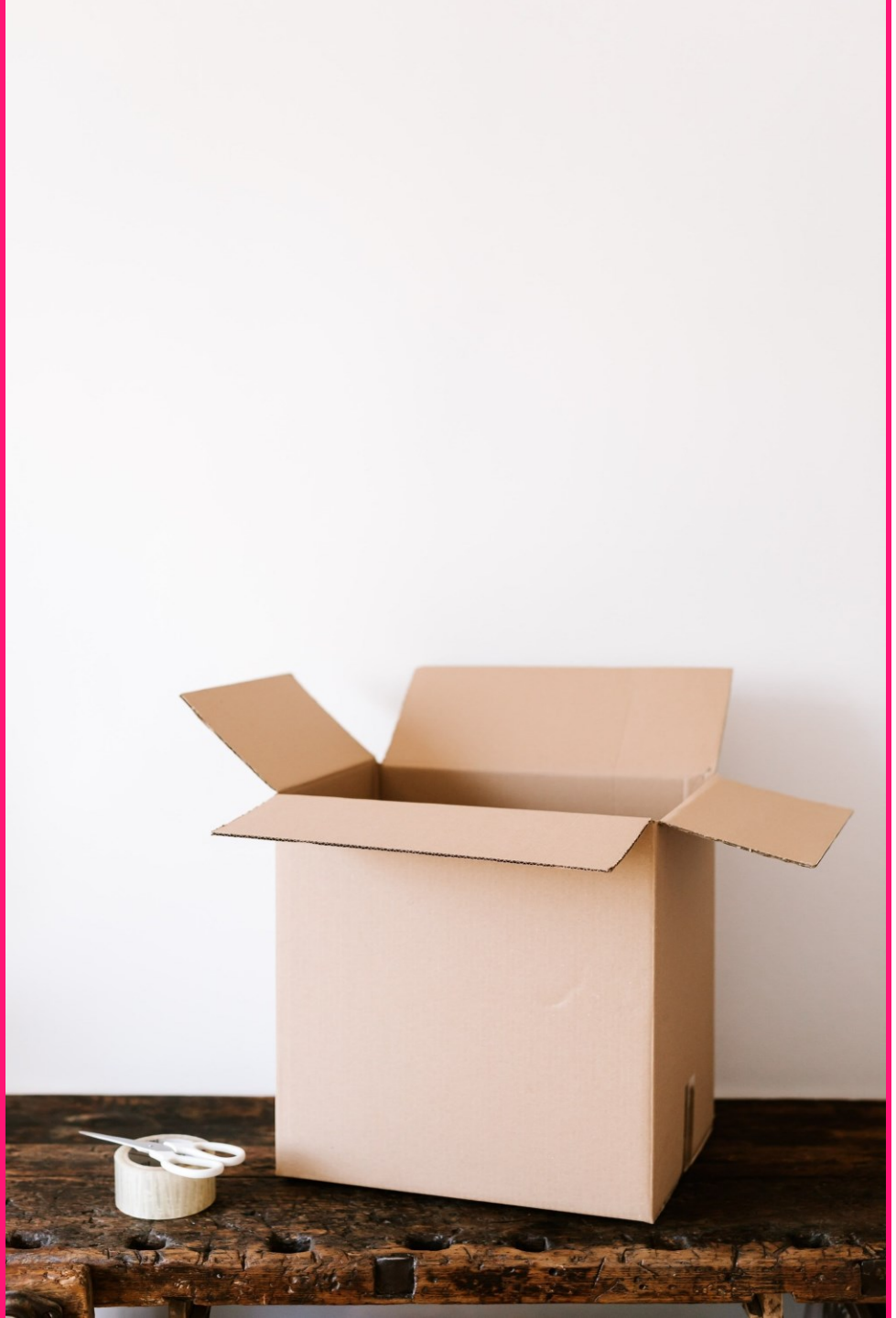
Getting Ready

Windows 10/11 Desktop

Course downloads

Optional: Visual Studio Code

https://code.visualstudio.com/



What is a Variable?

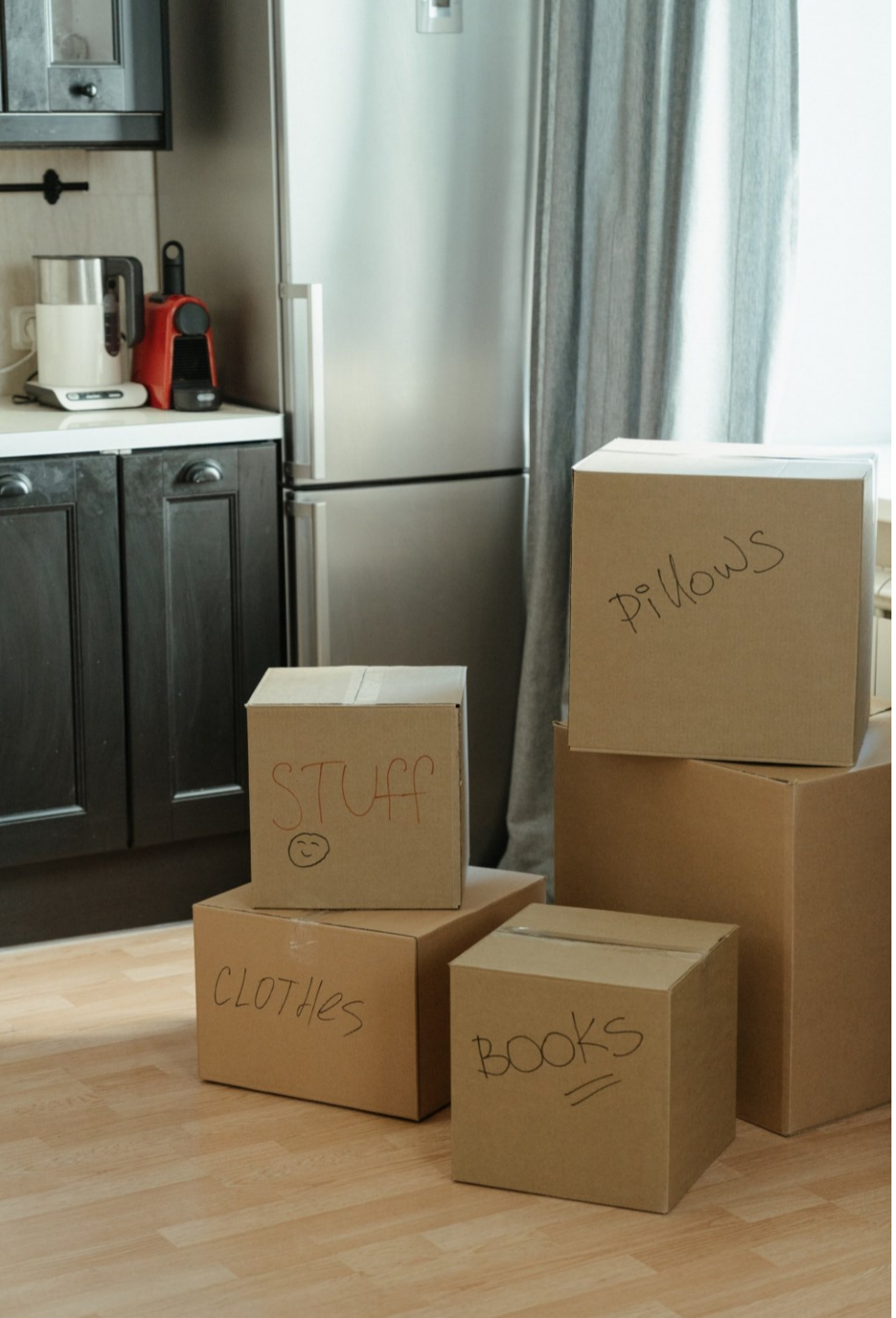
- A placeholder
- A “container” that holds PowerShell “things”

A variable is nothing without something in it

- Although you can have an empty variable

Variables make PowerShell re-usable

- Used interactively and when scripting



Windows PowerShell loads with many pre-defined variables

You can define your own

You can usually change values

Variables are not persistent between PowerShell sessions

- Use a PowerShell profile script to define your variables

```
PS C:\> $a = 1
```

Creating Variables

Assign a value with the = sign
The variable name is ‘a’
Use the $ to reference it in PowerShell

```
PS C:\> $a
1
```

Creating Variables

```
PS C:\> $a = 2
```

Creating Variables

Assign a new value
Lasts for the duration of your PowerShell session

```
PS C:\> $a = 2
```

Variables are Placeholders

```
PS C:\> $a = 2
PS C:\> Get-Vegetable | Select-Object -First $a

UPC     Count Name                 State    Color
---     ----- ----                 -----    -----
4078       12 corn                 Roasted  yellow
4064        4 tomato               Raw      red
```

Variables are Placeholders

```
PS C:\> $a = 5
```

Variables are Placeholders

Change the variable value

```
PS C:\> $a = 5
PS C:\> $b = Get-Process | Select-Object -First $a
```

Variables are Placeholders

Results will be saved to variable b

```
PS C:\> $b | Select-Object Name
Name
----
ApplicationFrameHost
Box
Box.Desktop.UpdateService
BoxUI
cdarbsvc_v1.0.0_x64
```

Variables are Placeholders

```
PS C:\> $b | Sort-Object ws -Descending | Select-Object name,ws

Name                                   WS
----                                   --
Box                                131850240
BoxUI                               65785856
ApplicationFrameHost                41967616
Box.Desktop.UpdateService           34680832
cdarbsvc_v1.0.0_x64                  3141632
```

Variables are Placeholders

Don’t need to re-run Get-Process
Use when working with results from long-running commands

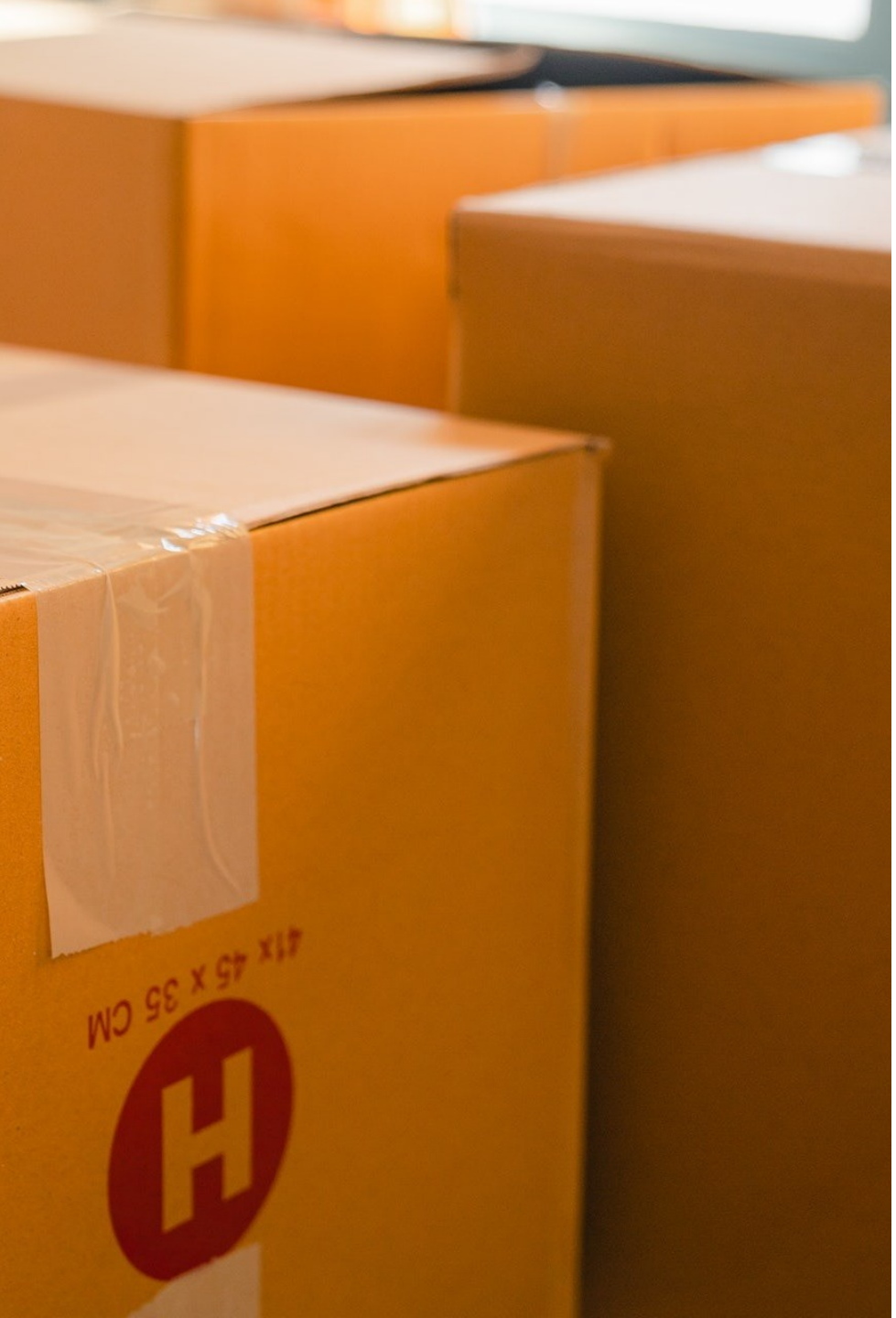
Variable Cmdlets

Get-Variable

New-Variable

Set-Variable

Remove-Variable



Variables are generally independent

You can remove a variable without affecting the original source

You can remove the original source without affecting the variable

Test everything

Variables in Action

```
PS C:\> $name = "Jeff"
```

Variable Expansion

Typical string usage

```
PS C:\> $name = "Jeff"
PS C:\> "Hello, my name is $name."
```

Variable Expansion

Typical string usage
Showing in the console but you'll do this more often in scripting

```
PS C:\> $name = "Jeff"
PS C:\> "Hello, my name is $name."
Hello, my name is Jeff.
```

Variable Expansion

Variables are expanded in double quotes
Works for simple values

```
PS C:\> $name = "Jeff"
PS C:\> 'Hello, my name is $name.'
```

Variable Expansion

But be careful of quoting

```
PS C:\> $name = "Jeff"
PS C:\> 'Hello, my name is $name.'
Hello, my name is $name.
```

Variable Expansion

Variables are not expanded within single quotes

```
PS C:\> $svc = Get-Service BITS
PS C:\> $svc | select name,status

Name  Status
----  ------
BITS Stopped
```

Complex Variable Expansion

An object with two properties

```
PS C:\> $svc = Get-Service BITS
PS C:\> $svc | select name,status

Name  Status
----  ------
BITS Stopped

PS C:\> "$svc.name is $svc.status"
```

Complex Variable Expansion

An object with two properties
This will fail

```
PS C:\> $svc = Get-Service BITS
PS C:\> $svc | select name,status

Name  Status
----  ------
BITS Stopped

PS C:\> "$svc.name is $svc.status"
System.ServiceProcess.ServiceController.name is System.ServiceProcess.Ser...
```

Complex Variable Expansion

An object with two properties
This will fail
Need to use *subexpressions*

```
PS C:\> "$($svc.name) is $($svc.status)"
```

SubExpressions

Wrap the object property in $()
This creates an implicit variable
Which PowerShell will expand

```
PS C:\> "$($svc.name) is $($svc.status)"
BITS is Stopped
```

SubExpressions

Wrap the object property in $()
This creates an implicit variable
Which PowerShell will expand
Remember to use double quotes

Variable Expansion

Advanced Options

Tee-Object

-OutVariable

-PipelineVariable

```
PS C:\> Get-Process ls* | Tee -Variable p
```

Tee-Object

Get expression result AND save to a variable

```
PS C:\> Get-Process ls* | Tee -Variable p

 NPM(K)    PM(M)      WS(M)     CPU(s)      Id  SI ProcessName
 ------    -----      -----     ------      --  -- -----------
      6     1.17       3.34       0.11    1452   0 LsaIso
     28    12.40      26.09   2,050.42    1460   0 lsass
     19    74.40       0.65       0.34    3392   1 LSB
```

Tee-Object

Get expression result AND save to a variable

```
PS C:\> $p | measure-object ws -sum

Count             : 3
Average           :
Sum               : 31789056
Maximum           :
Minimum           :
StandardDeviation :
Property          : WS
```

Tee-Object

Use the variable as a placeholder

```
PS C:\> $p | measure-object ws -sum -outvariable m

Count             : 3
Average           :
Sum               : 31789056
Maximum           :
Minimum           :
StandardDeviation :
Property          : WS
```

-OutVariable

Common cmdlet parameter
Save output from a pipeline segment

```
PS C:\> $m.sum
31789056
```

-OutVariable

I could also have used Tee-Object

```
PS C:\> 1..5 |
foreach-object -pipelinevariable a {$_} |
foreach-object -pipelinevariable b {$_*2} |
foreach-object {"$a * 2 = $b"}
```

-PipelineVariable

Advanced concept
Save pipeline segment output across a pipeline
Temporary, in-memory variable

```
PS C:\> 1..5 |
foreach-object -pipelinevariable a {$_} |
foreach-object -pipelinevariable b {$_*2} |
foreach-object {"$a * 2 = $b"}
1 * 2 = 2
2 * 2 = 4
3 * 2 = 6
4 * 2 = 8
5 * 2 = 10
```

-PipelineVariable

Special use case scenarios

Other Variable Options