

# Powershell 101

How to Code in Powershell

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## Coding Hygiene

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when coding in  
Powershell

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find in any  
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# 01

## Coding Hygiene

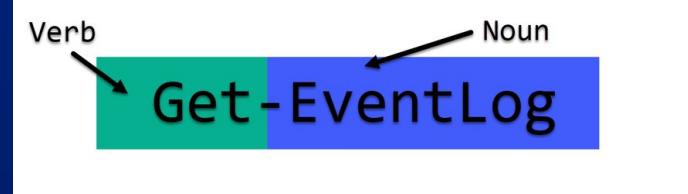
Things to know when  
coding in Powershell

## Dos

### How to write effective code:

- Use the complete cmdlet/function name (eg. Set-Location vs chdir)
- Utilize proper capitalization (eg. Write-Host vs write-host)
- Use consistent indentation and proper form
- Keep it simple (less is more)
- Use clear variable names (eg. \$AppleTrees vs \$appletrees)

```
1 $UserTest = "John.Doe@company.com"
2 If (Get-Mailbox $UserTest) {
3     Write-Host "The mailbox for $UserTest was found".
4 } Else {
5     Write-Host "No mailbox was found with the email address of $UserTest."
6     If ($_.ServerName -match "DAGSERVER1") {
7         Write-Host "The mailbox for $UserTest was on DAGSERVER1."
8     } Else {
9         Write-Host "The mailbox for $UserTest was not on DAGSERVER1."
10    }
11 }
```



## Don'ts

```
cd C:\Program Files\Google\Chrome  
chdir C:\Users\Public  
  
If($env:USERNAME == "user") { echo("hello")}  
Else {  
    write-host "your bad" | grep "you" > file.txt}
```

```
1 $a = "I am the most important person in the world"  
2 $b = $a + 2  
3 $A = "I am the worst person in the world"  
4 $aa = 17  
5 $AAA = 923131  
6 $aAaA = "124192301"
```

- Use aliases in your code (makes it hard to read)
- Use nondescript variable names (eg. \$x vs \$UserCount)
- Have inconsistent indentation and braces/brackets
- Be the only one who can read your code
  - (You are on a TEAM!)

A complex, abstract pattern of blue lines and dots resembling a circuit board or a network of neurons. The lines are various shades of blue, from light cyan to dark slate, and they intersect at numerous points where small, glowing blue spheres are located. This pattern serves as a background for the title.

02

# Essentials

Programming Basics

# IF Statements

If statements are used to determine conditional values on whether or not code should run.

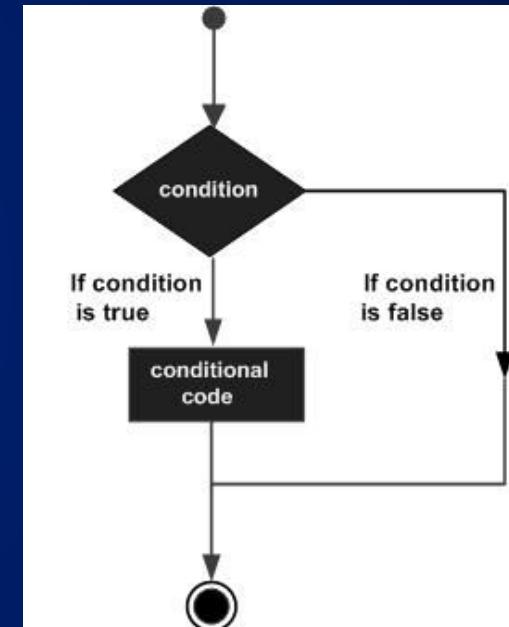
It's have 3 states: If, Elseif, and Else.

- **If:** Necessary, determines to run code based on whether or not the input is True or False
- **Elseif:** Optional, runs another if statement if the previous one evaluated to False
- **Else:** Optional, if all statements prior evaluated to false, this statement is run.

```
$number=17

if($number -le 20)
{
    $number+=5
}
elseif($number -gt 20)
{
    $number-=12
}
else
{
    $number=21
}

Write-Host($number)
```



## Nested Ifs:

If statements can be nested inside of each other to check multiple conditions.

```
$x = 30  
$y = 10  
  
if($x -eq 30){  
    if($y -eq 10) {  
        write-host("X = 30 and Y = 10")  
    }  
}
```

## Multiple Conditions:

If statements can have multiple conditions using “-and” and “-or”

```
$x = 30  
$y = 10  
  
if(($x -eq 30) -and ($y -eq 10))  
{  
    Write-Host("X = 30 and Y = 10")  
}
```

# Comparison Operators

**-eq**

**Equals; =**

Evaluates to TRUE if both sides are equivalent

**-ge**

**Greater or Equal to; >=**

Evaluates to TRUE if the left side is greater than or equal to the right

**-gt**

**Greater Than; >**

Evaluates to TRUE if the left side is greater than the right

**-ne**

**Not Equals; !=**

Evaluates to TRUE if both sides are different

**-le**

**Less or Equal to; <=**

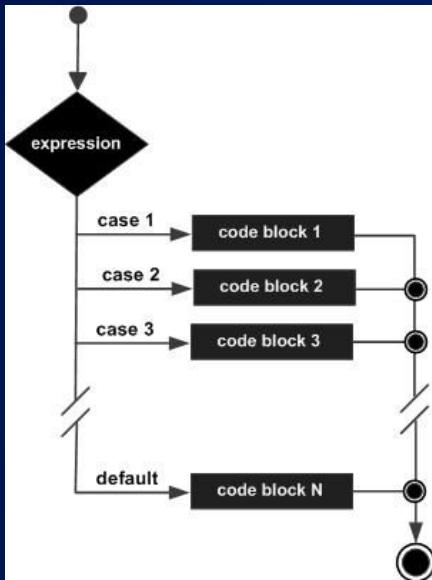
Evaluates to TRUE if the left side is less than or equal to the right

**-lt**

**Less Than; <**

Evaluates to TRUE if the left side is less than the right

# Switch Statements



```
$x = 3|  
switch($x){  
    1{"One"; break;}  
    2{"Two"; break;}  
    3{"Three"; break;}  
    4{"Four"; break;}  
    5{"Five"; break;}  
    default{"Zero"; break;}  
}
```

Switch statements are useful to avoid using long If-Else chains.

A switch statement takes a singular input and selects an output based on the available choices.

Switch statements run top to bottom, so having a "break;" after each condition is proper form.

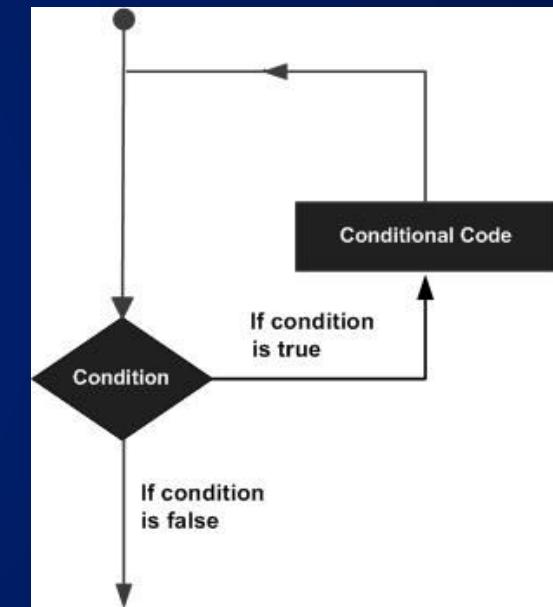
# Loops

Loops are useful for doing repetitive tasks or for executing a statement multiple times.

There are four types of loops: For, ForEach, While, Do...While:

- **For:** Execute a sequence of statements multiple times
- **ForEach:** Enhanced For Loop. Executes statements on each element in a collection
- **While:** Repeats a statement while the given condition is TRUE
- **Do...While:** A while loop, except the test condition exists at the end of the loop

```
$number=17  
  
if($number -le 20)  
{  
    $number+=5  
}  
elseif($number -gt 20)  
{  
    $number-=12  
}  
else  
{  
    $number=21  
}  
  
Write-Host($number)|
```



# For Loop:

Given a variable, repeats the loop until a condition is met. Similar in syntax to Java

```
$array = @("item1","item2","item3")  
  
for($i = 0; $i < $array.length; $i++)  
{  
    $array[$i]  
}
```

# ForEach Loop:

Given a collection of items, such as an array, repeats a statement for each item

```
$array = @("item1","item2","item3")  
  
foreach($element in $array)  
{  
    $element|  
}
```

```
$array = @("item1","item2","item3")
$counter = 0;

while($counter -lt $array.length){
    $array[$counter]
    $counter += 1
}
```

## While Loops:

As long as the conditional statement is TRUE, it will continue to execute the code

```
$array = @("item1","item2","item3")
$counter = 0;

do {
    $array[$counter]
    $counter += 1
} while($counter -lt $array.length)
```

## Do...While Loops:

Same thing as a while loop, except it checks for the conditional statement at the end. This means that the code is guaranteed to run at least once.



# 03

## File Manipulation

Writing, Reading, Editing,  
Executing, and Deleting

# Folders

## New-Item -ItemType Directory

A directory is equivalent to a Folder. By running this command it will spawn a new folder at PATH.

## Copy-Item PATH\_A PATH\_B

Copies a folder from PATH\_A to PATH\_B. This also maintains all contents of the folder.

## Move-Item PATH\_A PATH\_B

This removes the folder from the current path, PATH\_A, and moves it to a new location, PATH\_B.

## Test-Path

If there exists a folder path at this location, then it will return TRUE, otherwise it'll return FALSE.

## Remove-Item

Removes the folder at the given location. Also deletes the contents recursively.

## Rename-Item

Simply renames the folder. The folders should be exactly the same, the only difference being the name.

# Files

## New-Item -ItemType File

File is data written to a location. By running this command it will spawn a new file at PATH.

## Copy-Item PATH\_A PATH\_B

Copies a file from PATH\_A to PATH\_B. This also maintains all contents of the file.

## Move-Item PATH\_A PATH\_B

This removes the file from the current path, PATH\_A, and moves it to a new location, PATH\_B.

## Test-Path

If there exists a filepath at this location, then it will return TRUE, otherwise it'll return FALSE.

## Remove-Item

Removes the file at the given location. Also deletes the contents.

## Rename-Item

Simply renames the file. The files should be exactly the same, the only difference being the name.

# Why are folders and files the same?



In Powershell, both treated as objects. The reason they can both be manipulated the exact same is because they are Items. Items generally have basic properties such as name and location. In this way we can manipulate those properties of the Folder and File Items.

# Reading Content:

Get-Content reads the information from inside any file.

```
PS C:\Users\Aidan Masinsin\Desktop\Windows Scripts> Get-Content text.txt  
Hello World!
```

# Writing Content:

Set-Content changes the contents of the specified file.

```
Set-Location "C:\Users\Aidan Masinsin\Desktop\Windows Scripts"  
New-Item text.txt  
Set-Content text.txt "Hello World!"  
Get-Content text.txt  
Set-Content text.txt "Change da world. My final message. Goodbye."  
Get-Content text.txt|
```

# Adding Content:

Append-Content adds input content onto the end of the file instead of replacing it

```
Set-Location "C:\Users\Aidan Masinsin\Desktop\Windows Scripts"  
New-Item text.txt  
Set-Content text.txt "One Fish, Two Fish."  
Get-Content text.txt  
Append-Content text.txt "Red Fish, Blue Fish."  
Get-Content text.txt
```

# Erasing Content:

Clear-Content clears all of the content inside of the file

```
Set-Location "C:\Users\Aidan Masinsin\Desktop\Windows Scripts"  
New-Item text.txt  
Set-Content text.txt "One Fish, Two Fish."  
Get-Content text.txt  
Clear-Content text.txt  
Get-Content text.txt
```

# Reading File Line-by-Line

Using Foreach in Script:

```
$regex = "(8000)[0-9]{5}"  
  
foreach($line in Get-Content file.txt) {  
    if($line -match $regex){  
        $line  
    }  
}
```

Using Foreach-Object with Pipe:

```
$regex = "(8000)[0-9]{5}"  
  
Get-Content file.txt | ForEach-Object {  
    if($_ -match $regex){  
        $_  
    }  
}
```



# 04

## Running Scripts

Getting the thing to run

# Why is my script not running?

## Set-ExecutionPolicy

The execution policy is the level in which scripts in powershell are allowed to run. This is to prevent any harmful or malicious scripts from being run without the user's knowledge. There are 5 levels of execution policy:

- Restricted
  - Will not let ANY Powershell scripts to run, only individual commands
- AllSigned
  - Only SIGNED Powershell scripts can run
- RemoteSigned
  - Allows unsigned local scripts and SIGNED REMOTE scripts to run
- Unrestricted
  - Allows unsigned scripts to run, but will warn when running downloaded scripts
- Bypass
  - ALL scripts are allowed to run, no warnings or prompts

# Powershell File Types

**.ps1**

**Powershell Scripts;**  
most common type of  
PS file and similar to  
formats such as .bat  
or.sh

**.pssc**

**Powershell Session  
Configuration File;**  
Describes how the  
session environment is  
built. (We won't be  
using this one)

**.psm1**

**Powershell Modules;**  
these contain multiple  
function scripts that  
interact as a package.  
These are imported  
with Import-Module or  
Install-Module

**.psrc**

**Powershell Role  
Capability File;**  
Define a set of  
capabilities used in  
session configuration  
and .pssc files

**.psd1**

**Powershell Data File;**  
provide information  
and instructions for  
.psm1 files. Can serve  
as a help for  
Powershell Modules

**.ps1xml or .cdxml**

**Powershell XML;**  
XML is a common file  
format that marks up  
text. This is pretty  
much a .psd1 in an  
XML format.



05

# Debugging

Squish those bugs



# debugging

/dē'bägiNG/

Learn to pronounce

noun

the process of identifying and removing errors from computer hardware or software.

"software debugging"

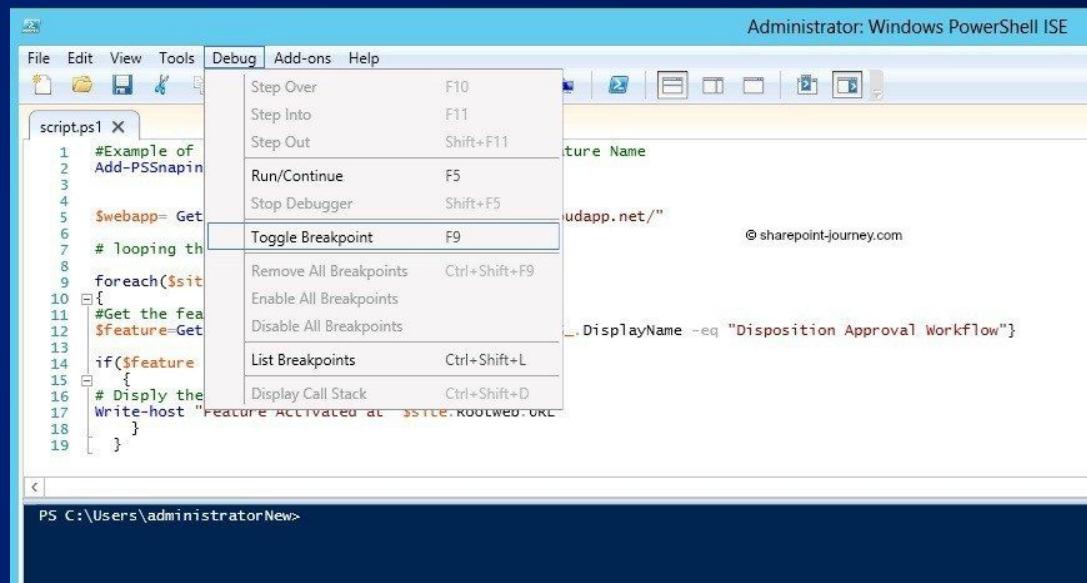
# Breakpoints

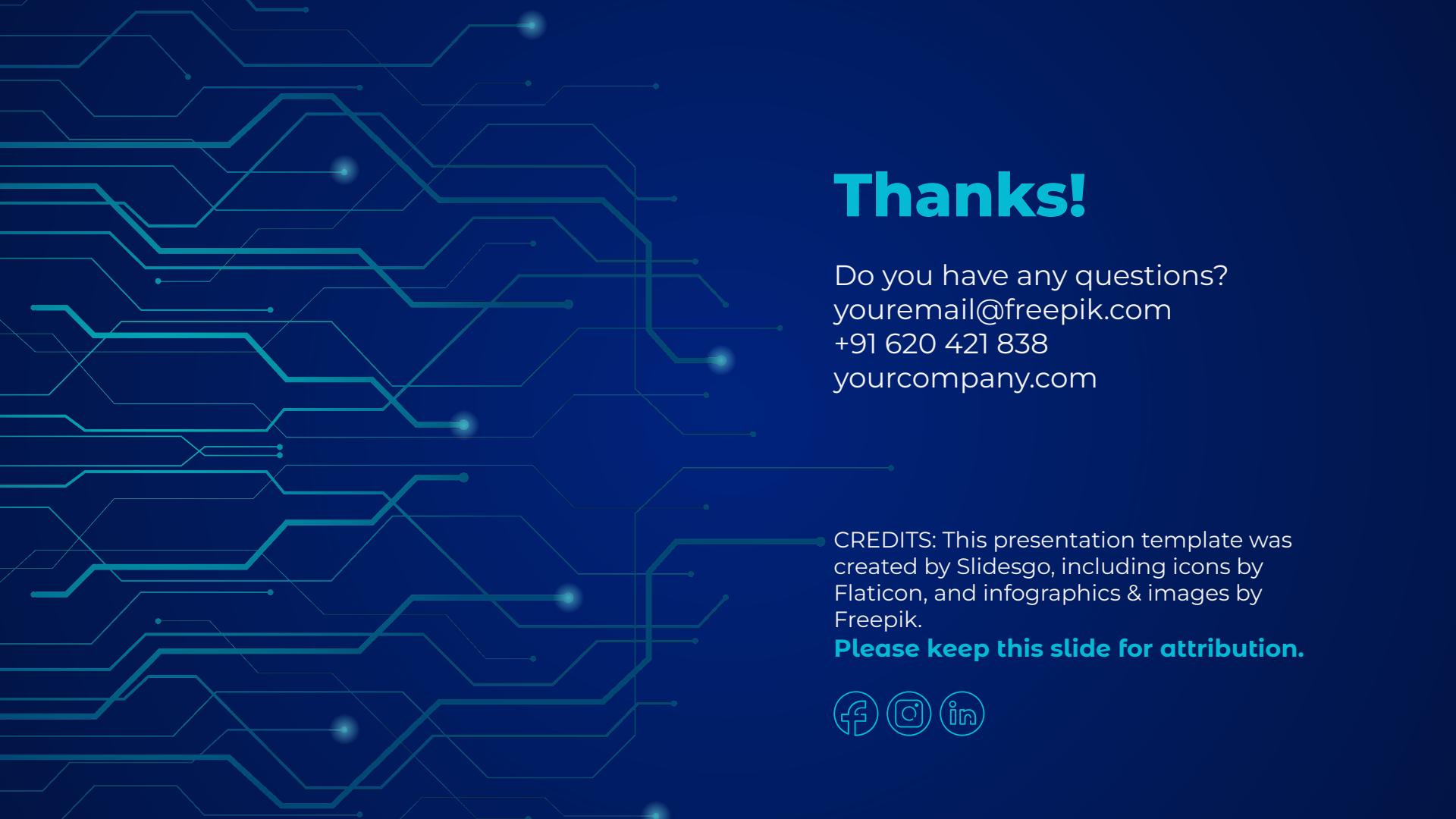
Breakpoints are points in the code in which your code will stop in order to figure out what is wrong.

There are two ways to toggle breakpoints:

- Right Click on Line + Toggle Breakpoint
- F9 Key

During a breakpoint you can execute code in what is known as the debugger. This is a shell which is running the current instance of your script. From here you can choose to continue your script or write code in the debug shell.



A complex, abstract background pattern resembling a circuit board or a network of interconnected lines in shades of blue and cyan.

# Thanks!

Do you have any questions?  
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- Neon lights technology background
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## ICONS:

- Technology Icon Pack

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#f3f3f3

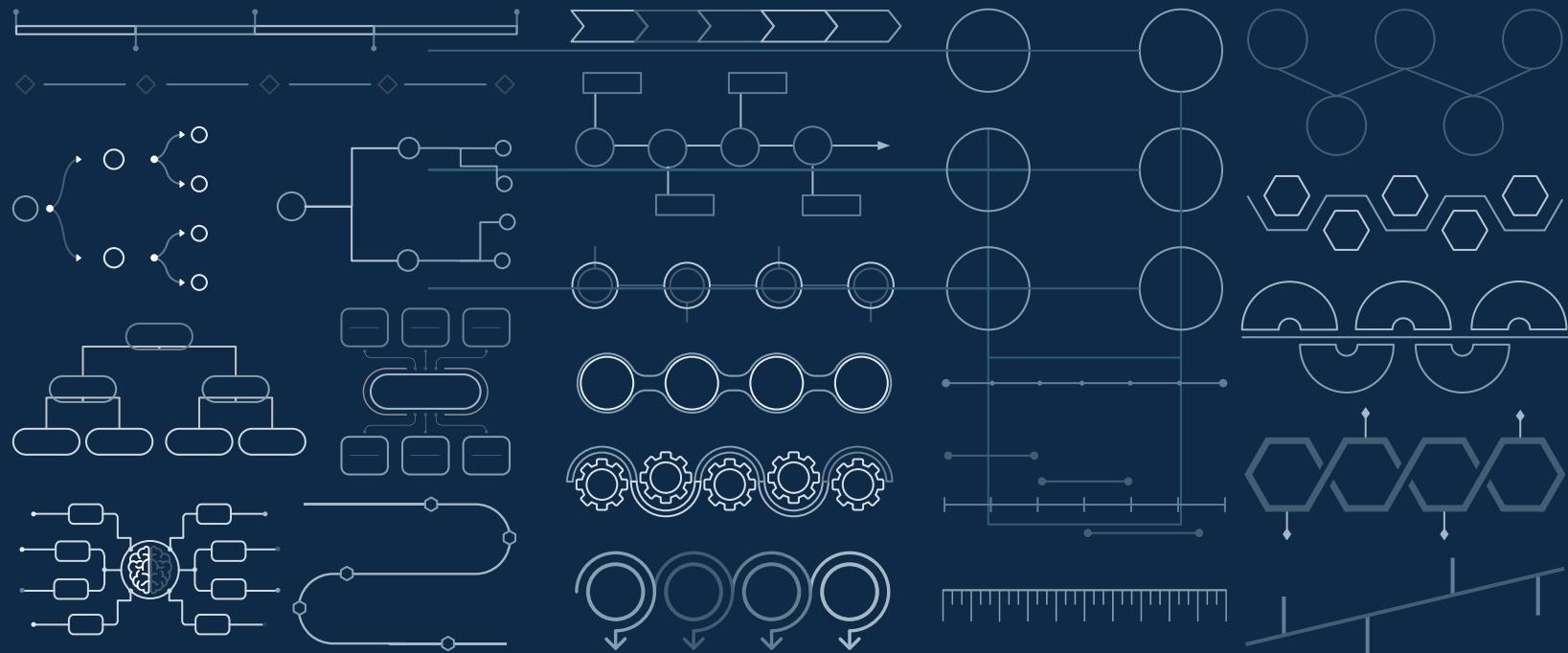
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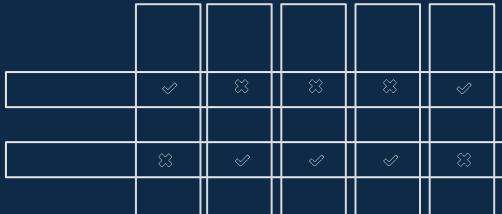
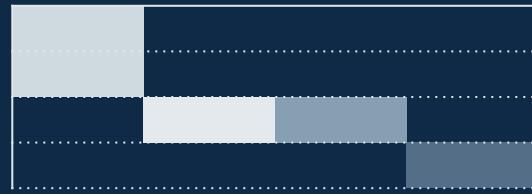
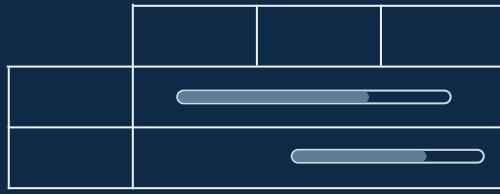
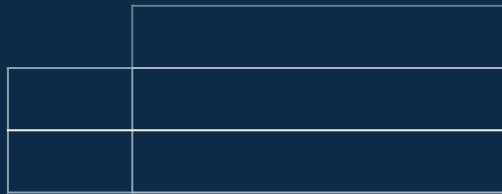
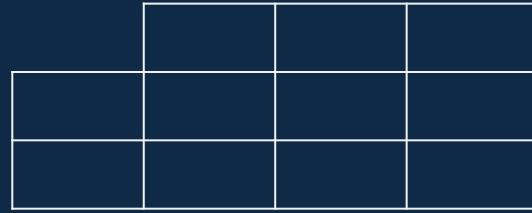
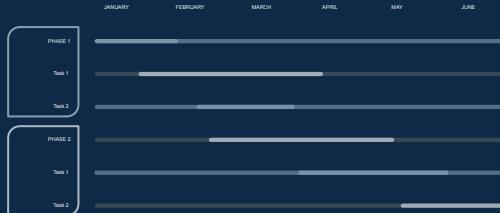
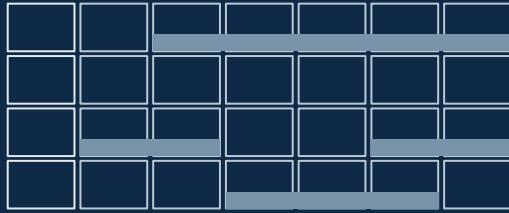
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Group the resource again when you're done.

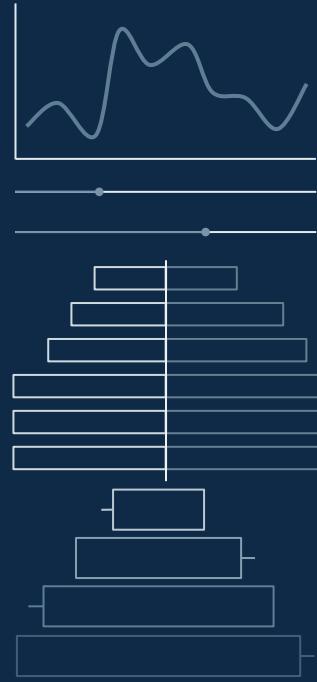
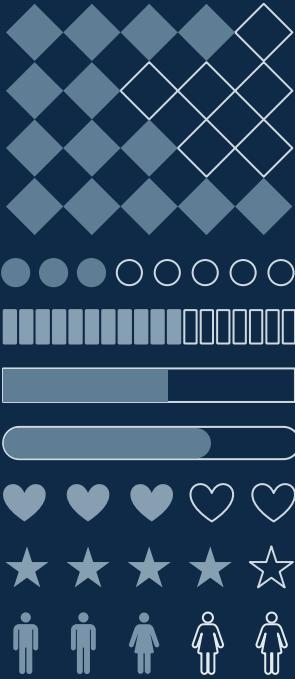
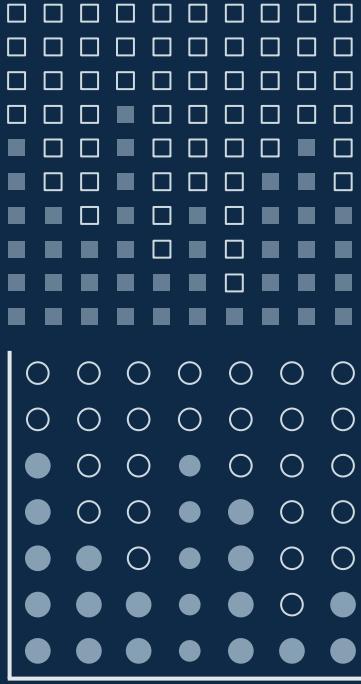












# ...and our sets of editable icons

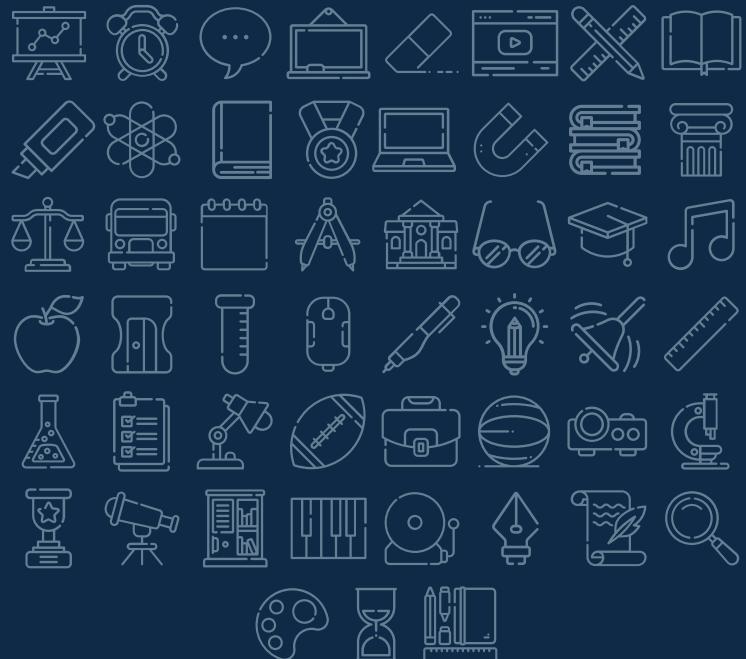
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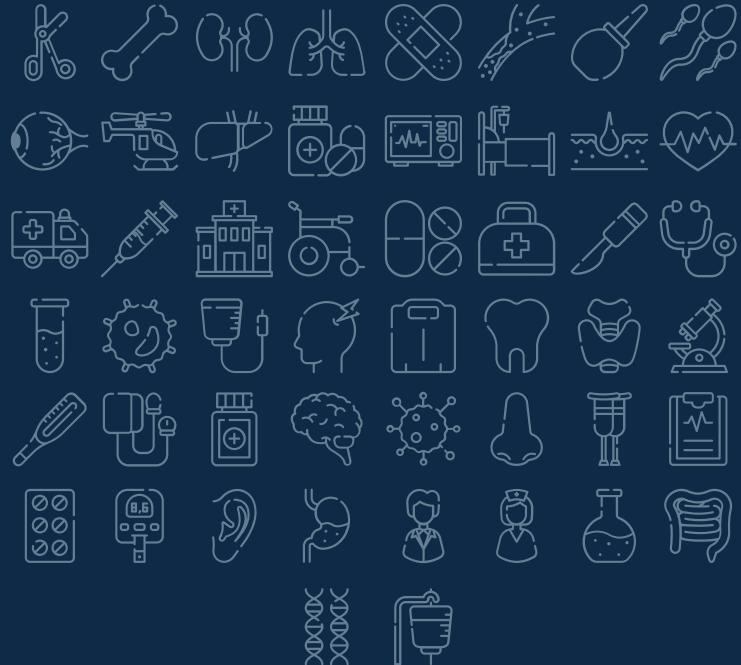
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