PowerShell + DevOps
Global Summit

PokaYoke

Mistake-Proofing your PowerShell scripts and functions

@Jaykul

April 7-10, 2025

Thank you Sponsors

Joel "Jaykul" Bennett

Principal DevOps Engineer

Solving problems with code
15x Microsoft MVP for PowerShell

github.com/Jaykul and PoshCode
discord.gg/PowerShell
HuddledMasses.org
@jaykul.powershell.social
@Jaykul@FOSStodon.org

What is Poka-Yoke?

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ポカ	Poka	Mistake
ヨケ	Yoke	Avoidance

What is Poka-Yoke?

ポカ	Poka	Mistake
ヨケ	Yoke	Avoidance

A set of techniques and tools used to prevent errors or defects

Where do bugs come from?

Where do bugs come from?

Mistakes

Obviously. You didn't make them on purpose...

Mistakes Should Be

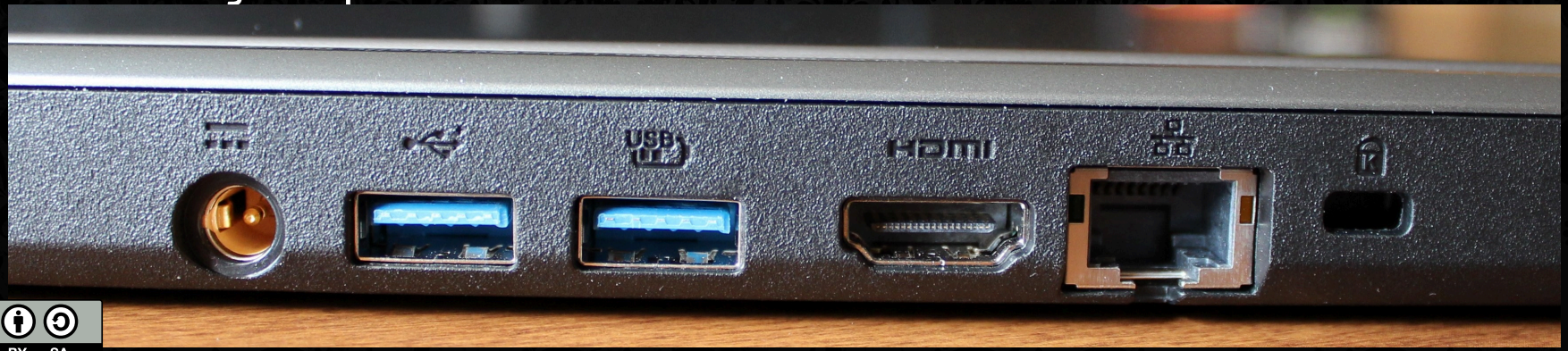
Mistakes Should Be

Obvious at a glance

Mistakes Should Be

Obvious at a glance

Basically impossible



Falling Into the Pit of Success

Consistency (noun): Reliability, uniformity, or conformity. Logical coherence. A singular way of doing things.

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- Input Filter Parameters
- Parameter Binding by Property Name
- About_Classes
- Extending Output Objects
- Custom Formatting Files

Make Mistakes Impossible

Make Mistakes Impossible

Use CmdletBinding to Support Common Parameters

```
class Player { [string]$Name; [Position]$Position; [string] ToString() { return $this.Name } }
class Position { [int]$X; [int]$Y; [string] ToString() { return "" + $this.X + ", " + $this.Y } }

function Move-Player {
    [CmdletBinding()]
    param(
    ...
```

Make Mistakes Impossible

Strongly Type Variables and Parameters

```
enum Direction { North; East; South; West }

function Move-Player {
    [CmdletBinding()]
    param(
        [Direction]$Direction,
        [int]$Distance,
        [switch]$Force
    )
    ...
```

Make Mistakes Impossible

Carefully Choose Parameter Names

```
enum Direction { North; East; South; West }

function Move-Player {
    [CmdletBinding()]
    param(
        [Direction]$CardinalDirection,
        [int]$DistanceInMeters,
        [switch]$Force
    )
    ...
```

Make Mistakes Impossible

Use Validation attributes

```
[ValidateSet("North", "East", "South", "West")]
[string]$CardinalDirection,

[ValidateScript({
    if ($CardinalDirection -eq "North" -and $Player.Position.Y - $_ -lt 0) {
        throw "You can't move that far North. The edge is only $($Position.Y) away."
    }
    $true
})]
[ValidateRange(1, 8)]
[int]$DistanceInMeters,

[ValidateScript({ Test-Path $_ })]
[string]$Path
```

Make Mistakes Impossible

Use ArgumentCompleter

```
[ValidateSet("North", "East", "South", "West")]
[Direction]$CardinalDirection,
[ArgumentCompleter({ param($Name, $Parameter, $Partial, $Ast, $Bound )
    @(switch($Bound.CardinalDirection) {
        North { ($Player.Position.Y)..0 }
        South { (8-$Player.Position.Y)..0 }
        East  { (8-$Player.Position.X)..0 }
        West  { ($Player.Position.X)..0 }
        default {
            ($Player.Position.X, $Player.Position.Y, (8 - $Player.Position.X), (8 - $Player.Position.Y) | Sort -Desc)[0]
        }
    }) | Where { $_ -gt 0 } # Zero isn't a valid move
})]
[int]$DistanceInMeters
...
```

See also … IValidateSetValuesGenerator, ArgumentCompletions

Make Mistakes Impossible

Support ShouldProcess for -WhatIf and -Confirm

```
[CmdletBinding(SupportsShouldProcess, ConfirmImpact="High")]
param(
    [Direction]$CardinalDirection,
    [int]$DistanceInMeters,
    [switch]$Force
)
switch($CardinalDirection) {
    North { $NewPosition = [Position]@{ X = $Player.Position.X; Y = $Player.Position.Y - $DistanceInMeters; } }
    East  { $NewPosition = [Position]@{ X = $Player.Position.X + $DistanceInMeters; Y = $Player.Position.Y } }
    South { $NewPosition = [Position]@{ X = $Player.Position.X; Y = $Player.Position.Y + $DistanceInMeters;  } }
    West  { $NewPosition = [Position]@{ X = $Player.Position.X - $DistanceInMeters; Y = $Player.Position.Y } }
}
if ($Force -or $PSCmdlet.ShouldProcess($Player.Name, "Move ${DistanceInMeters} meters ${CardinalDirection} to ${NewPosi
    ...
```

Never Repeat a Mistake

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Write Regression Tests

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- Made a mistake?

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- Write a test!

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Use PSScriptAnalyzer

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Consistency facilitates intuition

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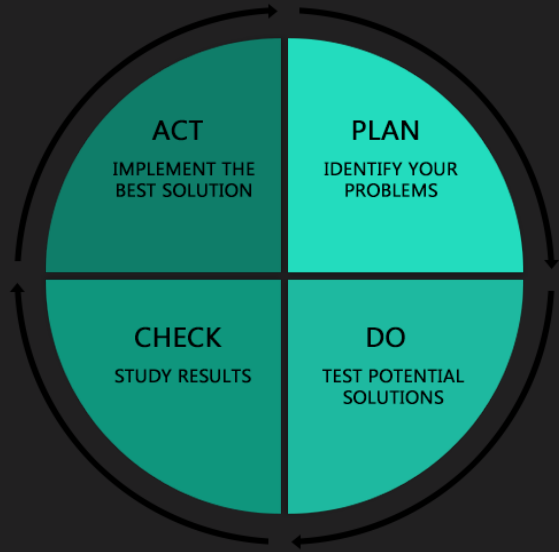
Consistency facilitates intuition

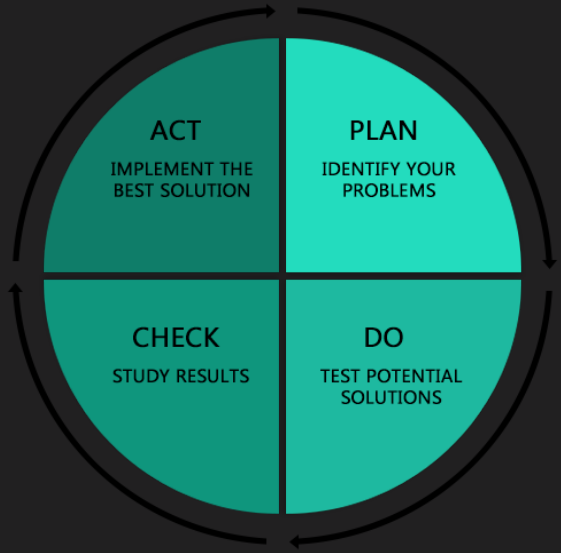
Consistency increases maintainability

Continuous Improvement



Continuous Improvement

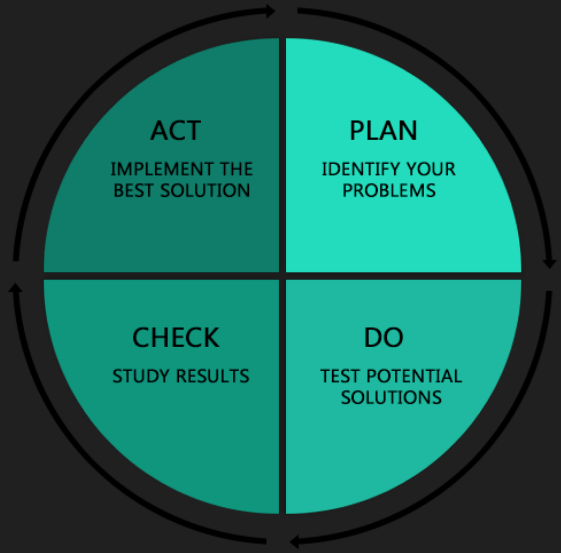
Plan-Do-Check-Act



Continuous Improvement

Plan-Do-Check-Act

1. **Plan**: Identify your (possible) problems



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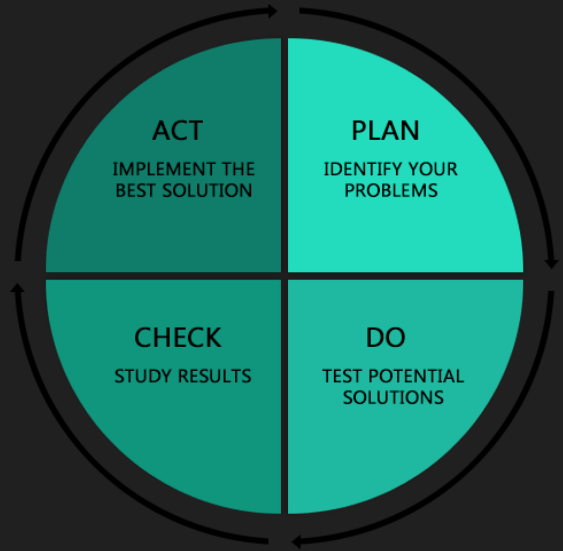
    The Five Whys



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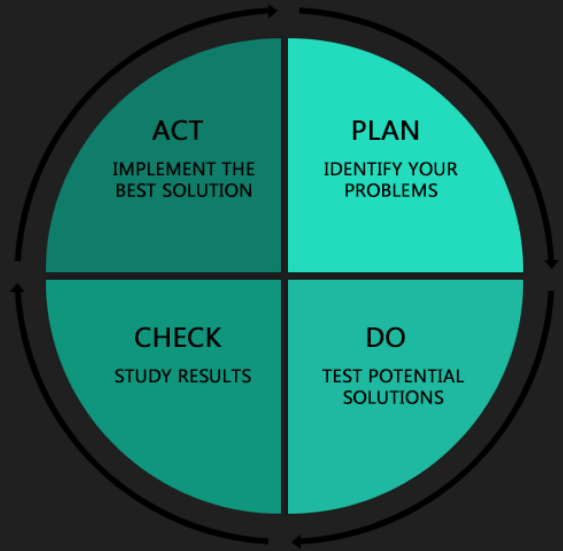
1. **Plan**: Identify your (possible) problems

    The Five Whys Ask Why, Five Times.



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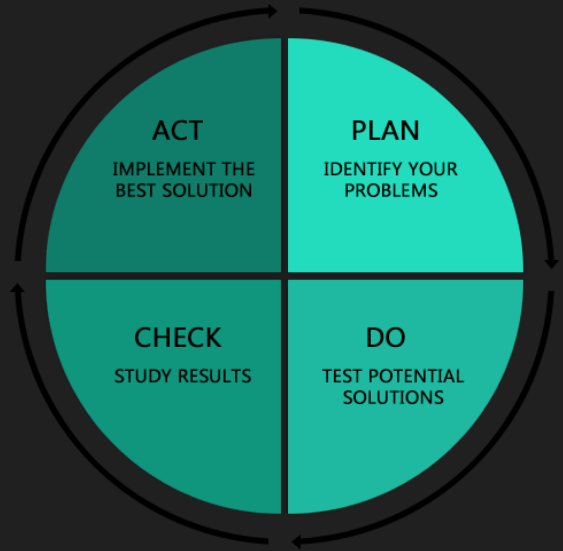
   Our deployments are failing



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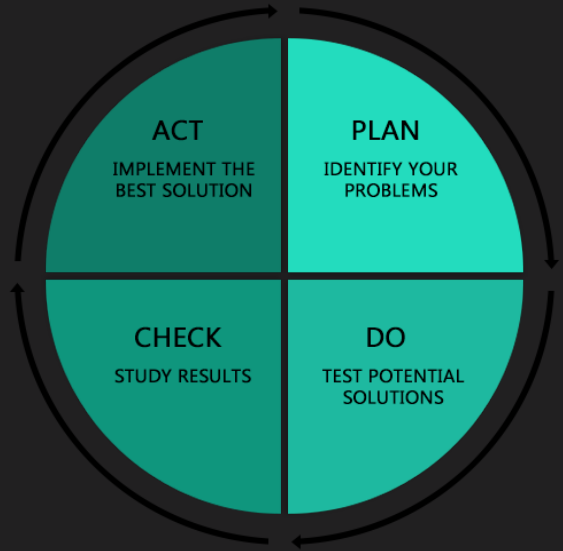

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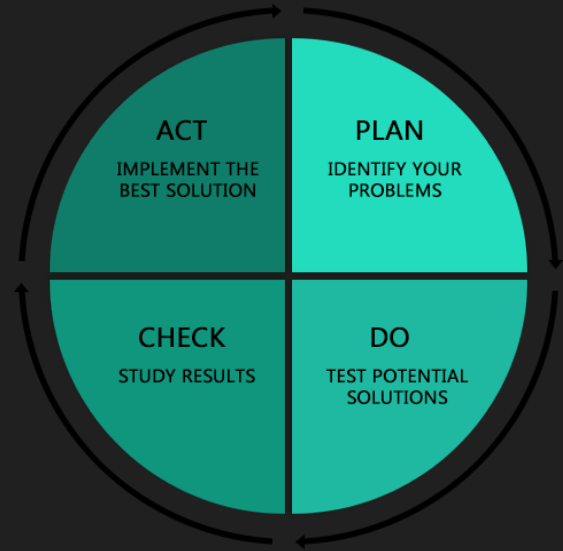

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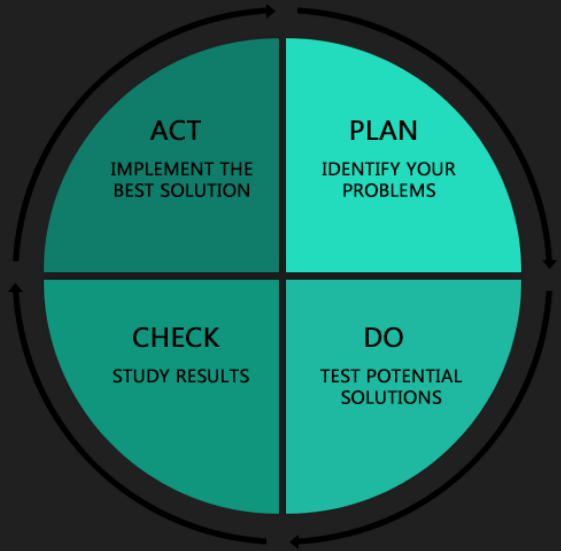

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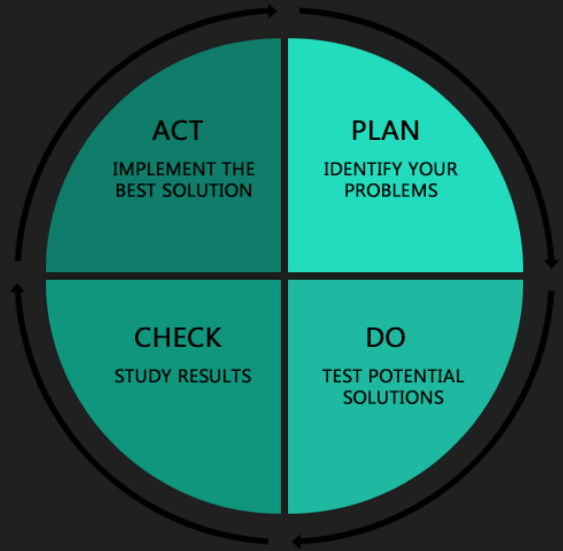

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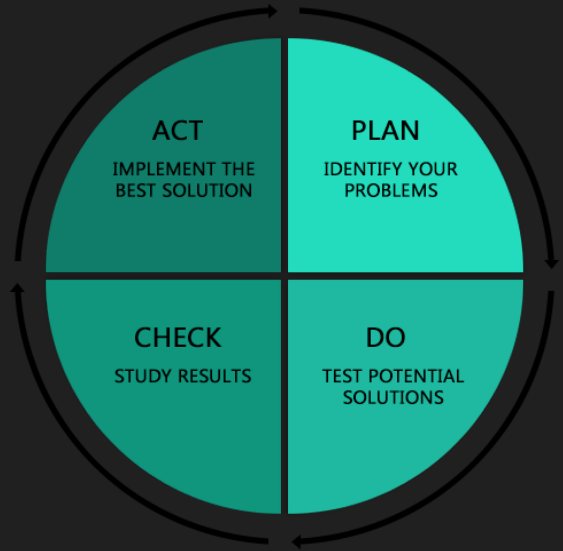
   5. Why? We forgot to change the password ahead of time.



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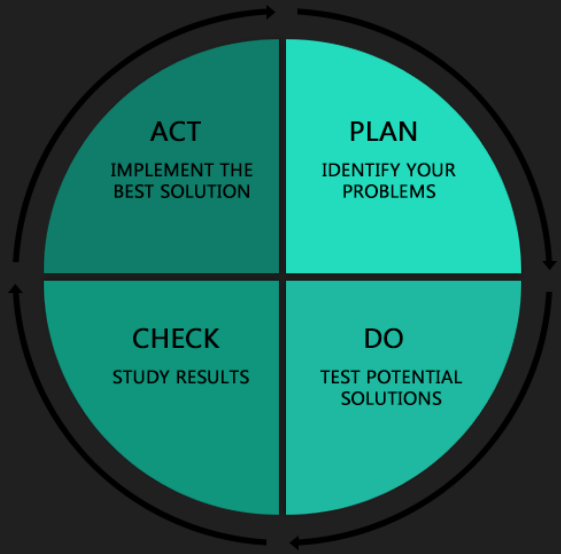
   … and possible solutions
   … and how to measure your results.



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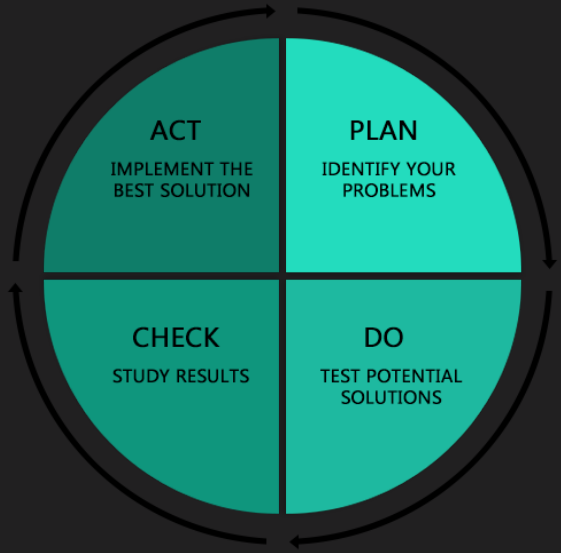

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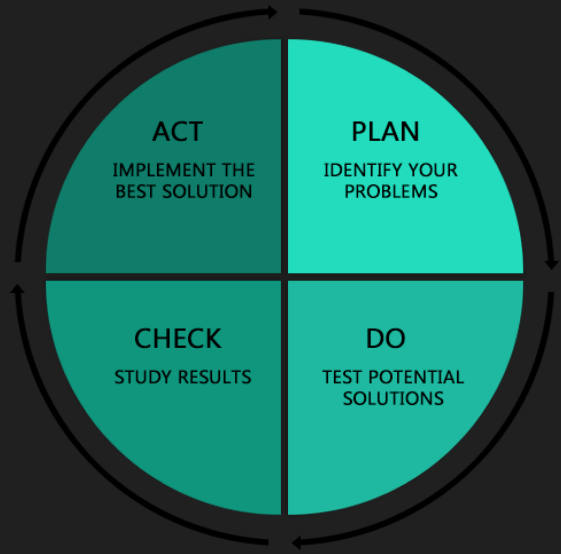

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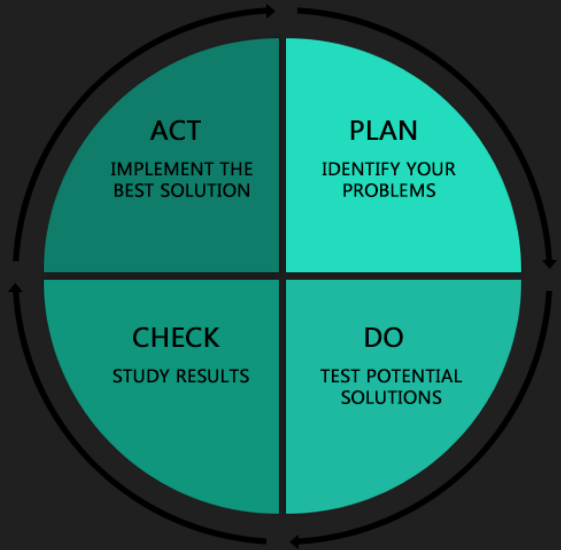
2. **Do**: Implement and test (mistake-proofing) solutions.
3. **Check**: Study the results. Compare solutions.
4. **Act**: Adjust. Implement the best solution. Document.
   Train your team(s).



Design By Writing ... Help F1

Plan:

Do:

Check:

Act:

Design By Writing ... Help F1

Plan: Write .EXAMPLEs for Common Scenarios

Do:

Check:

Act:

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Plan: Write .EXAMPLEs for Common Scenarios

Do: Implement Your Examples

Check:

Act:

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Act:

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Plan: Write .EXAMPLEs for Common Scenarios

Do: Implement Your Examples

Check: Test Your Examples

Act: Document Your Interface ALT + H

Detecting Mistakes

```powershell
function Move-Player {
    [CmdletBinding()]
    param()
    try {
        $MyInvocation.Instrument()
        Your-Code-Goes-Here
    # Special handling for errors you expect
    } catch [System.IO.FileNotFoundException] {
        Write-Error "The target game file was not found." -Recommend "Check the path and try again."
    } catch {
        Write-ErrorInformation -InformationAction $InformationPreference -InformationVariable global:MyGame_ErrorInforma
        Write-Error $_ -Recommend ("Please consider reporting this issue at https://github.com/Jaykul/DevOps2025/issues`
                "  Include as much information as you're comfortable sharing from `$MyGame_ErrorInformation | Set-Clipbo
    } finally {
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Error Handling & Logging

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THANK YOU!

Feedback is a gift. Please review this session!