

Informatika, 2. maila

PowerShell

Zer da PowerShell?

PowerShell komando linea interfaze bat eta script lengoai bat da, Microsoft-ek garatua.

Helburua

- Sistema adiministrazioaren automatizazioa.
- Sistema konfigurazioen gestioa.



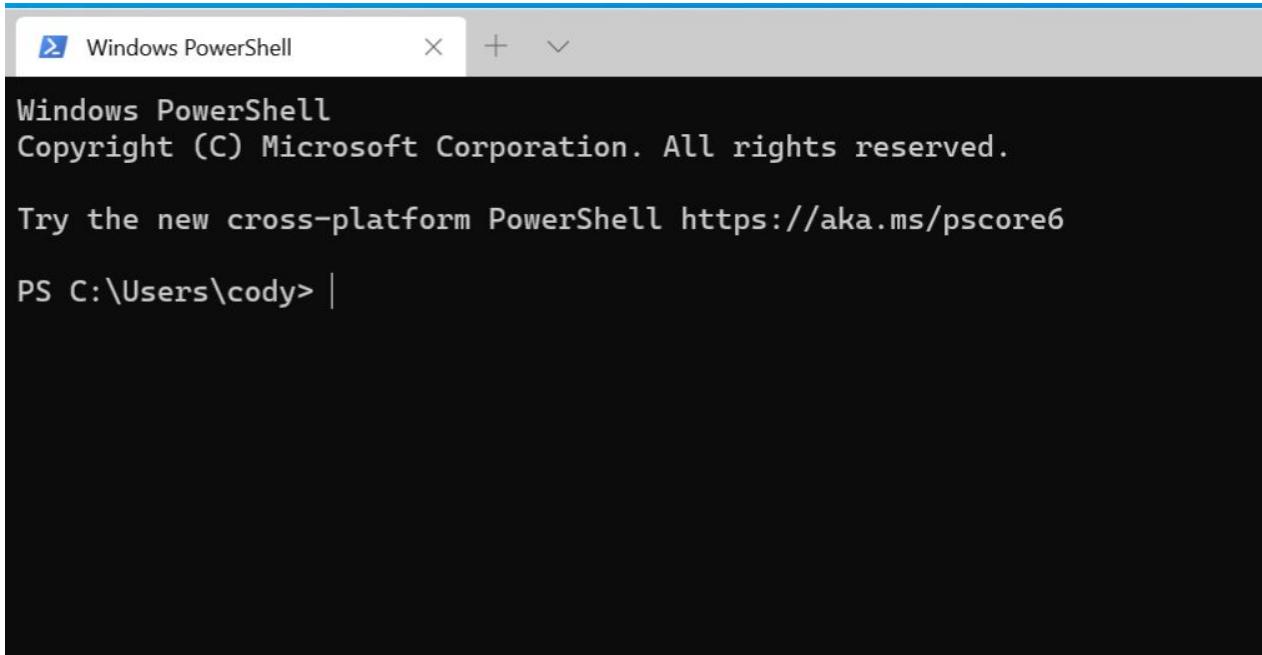
Ezaugarriak

- Windows-ekin integrazioa.
- Multiplataforma (Windows, MAC eta Linux).
- Kodigo pertsonalizatua idatzi daiteke.
- Automatizazioa (erabiltzaileen kudeaketa, sareko konfigurazioak, baimenak...).

Zertarako erabiltzen da PowerShell?

- **Erabiltzaile eta taldeen kudeaketa.**
 - Erabiltzaileak sortu, ezabatu, aldatu.
 - Baimenak.
- **Zerbitzari eta ordenagailuen kudeaketa**
 - Eguneraketak instalatu.
 - Segurtasun politikak aplikatu.
 - Monitorizazioa eta arazoen identifikazioa.
 - ...
- **Sareen gestioa**
 - Sare txartelen konfigurazioa.
 - IP helbideak, DNS, DHCP...
- **Lan administratiboen automatizazioa**
 - Segurtasun kopiak.
 - Erregistroen garbiketa.
 - Informeak sortu.
 - ...
- ...

Non idazten da PowerShell?



A screenshot of a Windows PowerShell window. The title bar says "Windows PowerShell". The content shows the standard PowerShell welcome message:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\cody> |
```

PowerShell komando linea
interfazea.

```
# Define the threshold for disk space in bytes (10 GB in this case)
$threshold = 10GB

# Define the email parameters
$smtpServer = "smtp.your-email-provider.com"
$smtpFrom = "alert@yourdomain.com"
$smtpTo = "admin@yourdomain.com"
$subject = "Disk Space Alert"

# Get the list of all drives
$drives = Get-PSDrive -PSProvider FileSystem

# Initialize an empty array to store alert messages
$alerts = @()

# Check each drive's free space
foreach ($drive in $drives) {
    if ($drive.Free -lt $threshold) {
        $alerts += "Drive $($([math]::Round($drive.Free / 1GB, 2)) GB left)"
    }
}

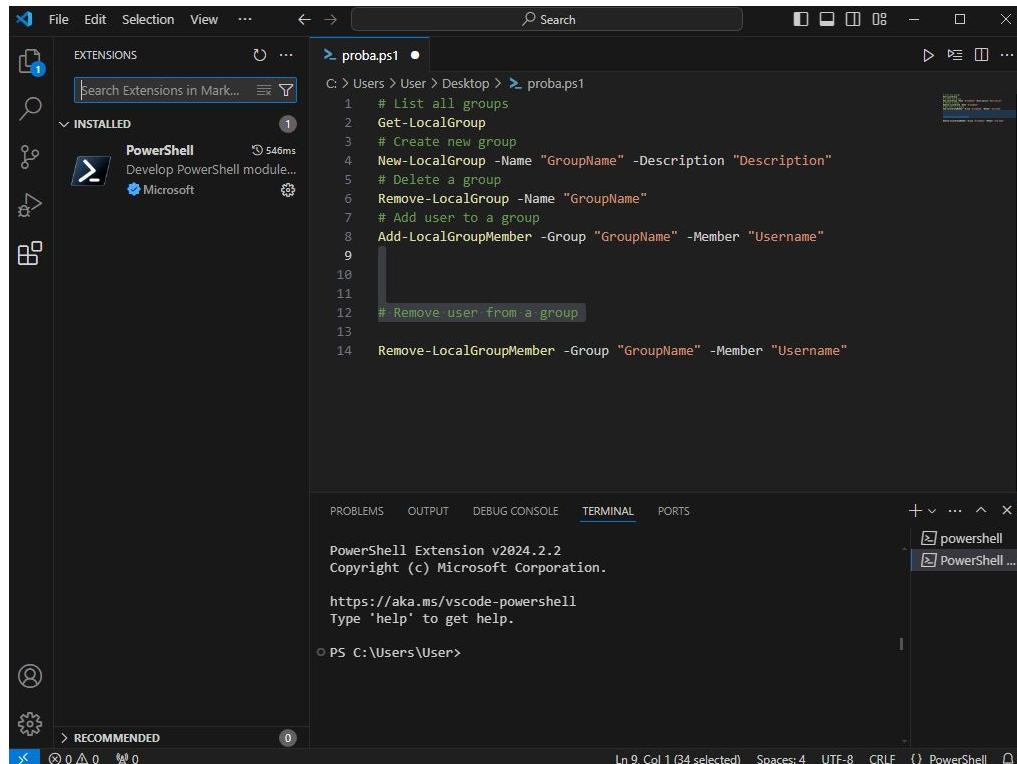
# If there are any alerts, send an email
if ($alerts.Count -gt 0) {
    $body = $alerts -join "`n"
    $message = New-Object system.net.mail.mailmessage
    $message.from = $smtpFrom
    $message.To.add($smtpTo)
    $message.Subject = $subject
    $message.Body = $body
    $smtp = New-Object Net.Mail.SmtpClient($smtpServer)
    $smtp.Send($message)
    Write-Output "Alert email sent."
} else {
    Write-Output "All drives have sufficient free space."
}
```

PowerShell scripta.

PowerShell garapen guneak

Visual Studio Code

- PowerShell addon-a instalatuta.

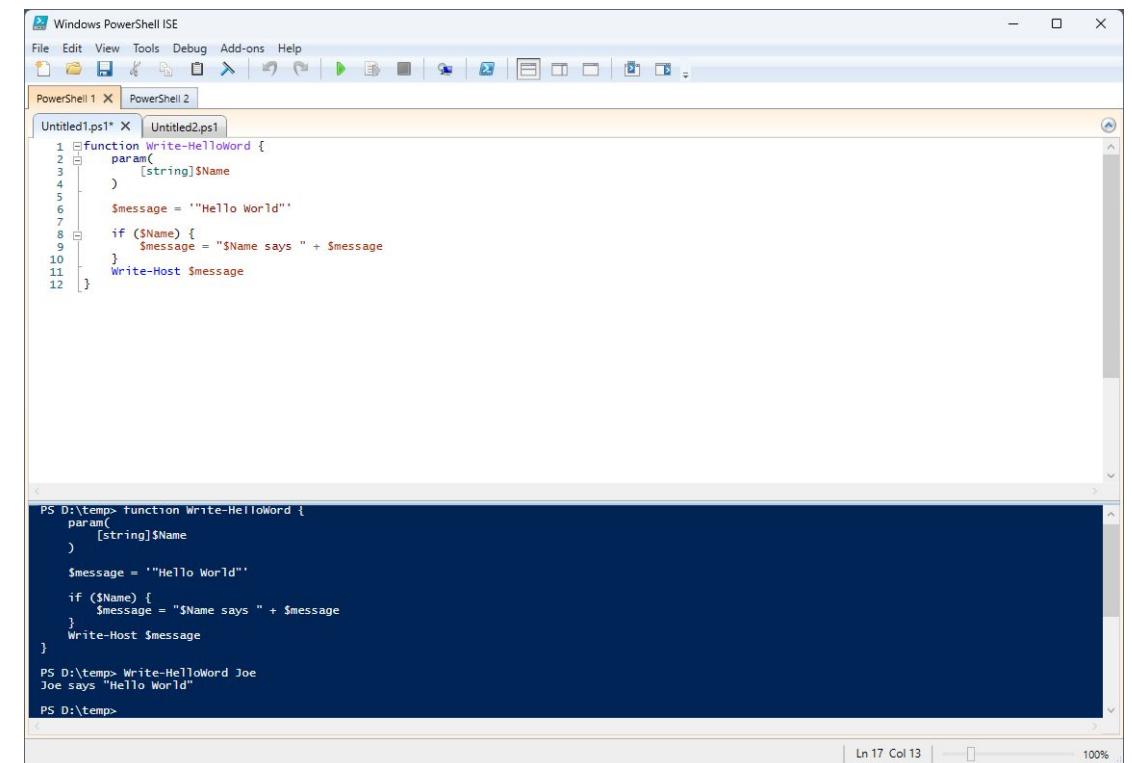


The screenshot shows the Visual Studio Code interface with a PowerShell extension installed. A file named `proba.ps1` is open in the editor. The code contains PowerShell commands for managing local groups, such as `Get-LocalGroup`, `New-LocalGroup`, `Remove-LocalGroup`, and `Add-LocalGroupMember`. The interface includes a sidebar for extensions, a terminal at the bottom, and a status bar at the bottom.

```

1 # List all groups
2 Get-LocalGroup
3 # Create new group
4 New-LocalGroup -Name "GroupName" -Description "Description"
5 # Delete a group
6 Remove-LocalGroup -Name "GroupName"
7 # Add user to a group
8 Add-LocalGroupMember -Group "GroupName" -Member "Username"
9
10
11 # Remove user from a group
12 Remove-LocalGroupMember -Group "GroupName" -Member "Username"
13
14
  
```

Windows PowerShell ISE



The screenshot shows the Windows PowerShell ISE interface. It has two tabs: `PowerShell 1` and `PowerShell 2`. In `PowerShell 1`, there is an untitled script with a function definition:

```

1 function Write-HelloWorld {
2     param(
3         [string]$Name
4     )
5
6     $message = "Hello World"
7
8     if ($Name) {
9         $message = "$Name says " + $message
10    }
11    Write-Host $message
12
  
```

In the bottom pane, a command is run in the PowerShell session:

```

PS D:\temp> function Write-HelloWorld {
    param(
        [string]$Name
    )
    $message = "Hello World"
    if ($Name) {
        $message = "$Name says " + $message
    }
    Write-Host $message
}

PS D:\temp> Write-HelloWorld Joe
Joe says "Hello World"

PS D:\temp>
  
```

Edozein testu editore erabili daiteke!

1

Oinarrizko komandoak

Oinarrizko komandoak

- Direktorio eta fitxategiak zerrendatu
 - ls

```
PS C:\Users\Administrator> ls

    Directory: C:\Users\Administrator

Mode                LastWriteTime     Length Name
----                -----          ---- 
d-r---        14/06/2024      1:52      3D Objects
d-r---        14/06/2024      1:52      Contacts
d-r---        22/07/2024     15:59     Desktop
d-r---        14/06/2024      1:52     Documents
d-r---        23/07/2024      9:35     Downloads
d-r---        14/06/2024      1:52    Favorites
d-r---        14/06/2024      1:52      Links
d-r---        14/06/2024      1:52      Music
d-r---        14/06/2024      1:52    Pictures
d-r---        14/06/2024      1:52   Saved Games
d-r---        14/06/2024      1:52    Searches
d-r---        14/06/2024      1:52    Videos
```

Oinarrizko komandoak

- Direktorioz mugitu edo aldatu
 - cd

```
PS C:\Users\Administrator> ls

Directory: C:\Users\Administrator

Mode                LastWriteTime     Length Name
----                -----          ---- 
d-r---        14/06/2024    1:52      3D Objects
d-r---        14/06/2024    1:52      Contacts
d-r---        22/07/2024   15:59     Desktop
d-r---        14/06/2024    1:52     Documents
d-r---        23/07/2024   9:35      Downloads
d-r---        14/06/2024    1:52    Favorites
d-r---        14/06/2024    1:52      Links
d-r---        14/06/2024    1:52      Music
d-r---        14/06/2024    1:52    Pictures
d-r---        14/06/2024    1:52  Saved Games
d-r---        14/06/2024    1:52    Searches
d-r---        14/06/2024    1:52    Videos

PS C:\Users\Administrator> cd Desktop
PS C:\Users\Administrator\Desktop> cd ..
PS C:\Users\Administrator>
```

Oinarrizko komandoak

- Terminala garbitu
 - clear

```
PS C:\Users\Administrator> ls

    Directory: C:\Users\Administrator

Mode                LastWriteTime     Length Name
----                -----          ---- 
d-r---        14/06/2024      1:52          3D Objects
d-r---        14/06/2024      1:52       Contacts
d-r---        22/07/2024      15:59      Desktop
d-r---        14/06/2024      1:52      Documents
d-r---        23/07/2024      9:35      Downloads
d-r---        14/06/2024      1:52      Favorites
d-r---        14/06/2024      1:52       Links
d-r---        14/06/2024      1:52       Music
d-r---        14/06/2024      1:52      Pictures
d-r---        14/06/2024      1:52   Saved Games
d-r---        14/06/2024      1:52      Searches
d-r---        14/06/2024      1:52      Videos

PS C:\Users\Administrator> cd Desktop
PS C:\Users\Administrator\Desktop> cd ..
PS C:\Users\Administrator> clear
```

```
PS C:\Users\Administrator>
```

Oinarrizko komandoak

- Direktorio (karpeta) bat sortu
 - mkdir

```
PS C:\Users\Administrator> mkdir karpeta_berria

    Directory: C:\Users\Administrator

Mode                LastWriteTime         Length Name
----                -----          ---- - 
d----        23/08/2024      8:56            karpeta_berria

PS C:\Users\Administrator> ls

    Directory: C:\Users\Administrator

Mode                LastWriteTime         Length Name
----                -----          ---- - 
d-r--        14/06/2024      1:52        3D Objects
d-r--        14/06/2024      1:52       Contacts
d-r--        22/07/2024     15:59      Desktop
d-r--        14/06/2024      1:52      Documents
d-r--        23/07/2024     9:35       Downloads
d-r--        14/06/2024      1:52      Favorites
d-----        23/08/2024     8:56      karpeta_berria
d-r--        14/06/2024      1:52       Links
d-r--        14/06/2024      1:52       Music
d-r--        14/06/2024      1:52      Pictures
d-r--        14/06/2024      1:52   Saved Games
d-r--        14/06/2024      1:52   Searches
d-r--        14/06/2024      1:52      Videos

PS C:\Users\Administrator>
```

Oinarrizko komandoak

- Fitxategi bat sortu

- New-Item -ItemType File -Name "filename.txt"

```
PS C:\Users\Administrator> New-Item -ItemType File -Name "fitxategi_berria.txt"

    Directory: C:\Users\Administrator

Mode                LastWriteTime         Length Name
----                -----          ----
-a---        23/08/2024      9:04            0 fitxategi_berria.txt

PS C:\Users\Administrator> ls

    Directory: C:\Users\Administrator

Mode                LastWriteTime         Length Name
----                -----          ----
d-r--        14/06/2024      1:52       3D Objects
d-r--        14/06/2024      1:52       Contacts
d-r--        22/07/2024     15:59      Desktop
d-r--        14/06/2024      1:52      Documents
d-r--        23/07/2024     9:35       Downloads
d-r--        14/06/2024      1:52      Favorites
d-----        23/08/2024     9:03   karpeta_berria
d-r--        14/06/2024      1:52       Links
d-r--        14/06/2024      1:52       Music
d-r--        14/06/2024      1:52      Pictures
d-r--        14/06/2024      1:52   Saved Games
d-r--        14/06/2024      1:52      Searches
d-r--        14/06/2024      1:52      Videos
-a---        23/08/2024     9:04            0 fitxategi_berria.txt

PS C:\Users\Administrator>
```

Oinarrizko komandoak

- Direktorio (karpeta) edo fitxategi bat mugitzen
 - mv

```
PS C:\Users\Administrator> mv fitxategi_berria.txt karpeta_berria
PS C:\Users\Administrator> ls .\karpeta_berria\  
  
Directory: C:\Users\Administrator\karpeta_berria  
  
Mode                LastWriteTime        Length Name
----                <-----              ----- -
-a---    23/08/2024      9:04                 0 fitxategi_berria.txt  
  
PS C:\Users\Administrator> -
```

Oinarrizko komandoak

- Direktorio (karpeta) edo fitxategi bat kopiatzen
 - cp

```
PS C:\Users\Administrator\karpeta_berria> ls

    Directory: C:\Users\Administrator\karpeta_berria

Mode                LastWriteTime         Length Name
----                -----          ---- - 
-a---        23/08/2024      9:04            0 fitxategi_berria.txt

PS C:\Users\Administrator\karpeta_berria> cp .\fitxategi_berria.txt .\fitxategi_berria_kopia.txt
PS C:\Users\Administrator\karpeta_berria> ls

    Directory: C:\Users\Administrator\karpeta_berria

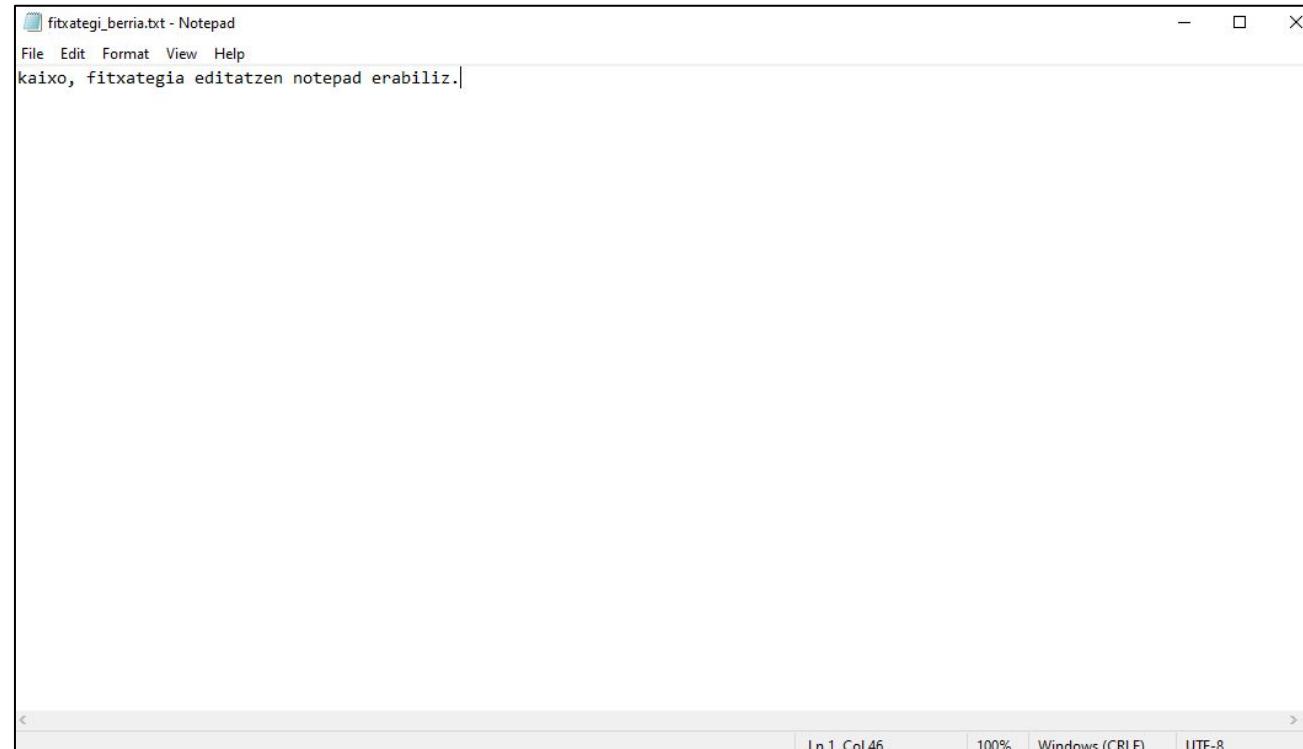
Mode                LastWriteTime         Length Name
----                -----          ---- - 
-a---        23/08/2024      9:04            0 fitxategi_berria.txt
-a---        23/08/2024      9:04            0 fitxategi_berria_kopia.txt

PS C:\Users\Administrator\karpeta_berria>
```

Oinarrizko komandoak

- Fitxategi bat editatzen
 - notepad.exe fitxategia.txt

```
PS C:\Users\Administrator\karpeta_berria> notepad.exe .\fitxategi_berria.txt
PS C:\Users\Administrator\karpeta_berria>
```



Oinarrizko komandoak

- Fitxategi baten edukia bistaratzen
 - cat

```
PS C:\Users\Administrator\karpeta_berria> cat .\fitxategi_berria.txt
kaixo, fitxategia editatzen notepad erabiliz.
PS C:\Users\Administrator\karpeta_berria>
```

Oinarrizko komandoak

- Direktorio (karpeta) edo fitxategi bat ezabatzen
 - rm

```
PS C:\Users\Administrator> rm karpeta_berria
PS C:\Users\Administrator> ls

    Directory: C:\Users\Administrator

Mode                LastWriteTime     Length Name
----                -              -          -
d-r---        14/06/2024      1:52    3D Objects
d-r---        14/06/2024      1:52    Contacts
d-r---        22/07/2024     15:59   Desktop
d-r---        14/06/2024      1:52   Documents
d-r---        23/07/2024     9:35    Downloads
d-r---        14/06/2024      1:52   Favorites
d-r---        14/06/2024      1:52    Links
d-r---        14/06/2024      1:52    Music
d-r---        14/06/2024      1:52   Pictures
d-r---        14/06/2024      1:52  Saved Games
d-r---        14/06/2024      1:52   Searches
d-r---        14/06/2024      1:52   Videos

PS C:\Users\Administrator> _
```

2

Aldagaiak eta datu motak

Aldagaiak eta datu motak

- **Aldagaien definizioa**

Aldagaiak \$ karakterea hasieran ipinita definitzen dira:

- \$aldaia1 = “Hello world”
- \$aldaia2 = 108

Aldagaiak eta datu motak

- Aldagai motak

```
$string = "Hello, World!"  
$integer = 42  
$float = 5.6  
$array = @ (1,2,3,4,5)  
$arrayCount = $array.Count  
$booltrue = $true  
$boolfalse = $false
```

Datu egiturak

- Aldagai motak

```
$hashTable = @{
    Name = "John Doe"
    Age = 30
    Occupation = "Developer"
}
```

```
$animals = @(
    @{
        Name      = "Lion"
        Species   = "Panthera leo"
        Habitat   = "Savanna"
        Diet      = "Carnivore"
    },
    @{
        Name      = "Elephant"
        Species   = "Loxodonta africana"
        Habitat   = "Forest"
        Diet      = "Herbivore"
    },
    @{
        Name      = "Dolphin"
        Species   = "Delphinus delphis"
        Habitat   = "Ocean"
        Diet      = "Carnivore"
    }
)
```

Aldagaiak eta datu motak

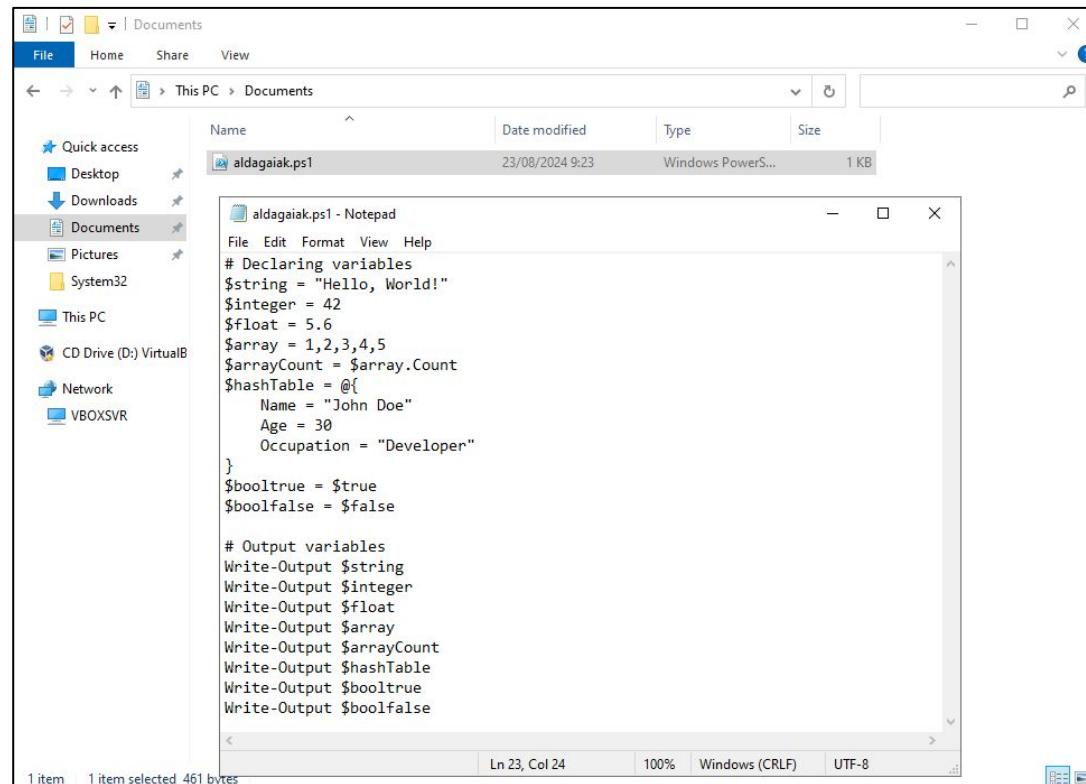
- **Aldagai baten balioa bistaratzen (print):**
 - Write-Output \$aldagaia

```
PS C:\Users\Administrator> $mezua = "Hello, World!"  
PS C:\Users\Administrator> Write-Output $mezua  
Hello, World!  
PS C:\Users\Administrator>
```

Terminal baten aldagai bat definitzen denean, terminala itixi egiten denean galdu egingo da. Zabalik dagoen bitartean bakarrik egongo da aldagaia eskuragarri.

Aldagaiak eta datu motak

- Aldagaiak PowerShell script batean erabiltzen (.ps1 fitxategi baten):

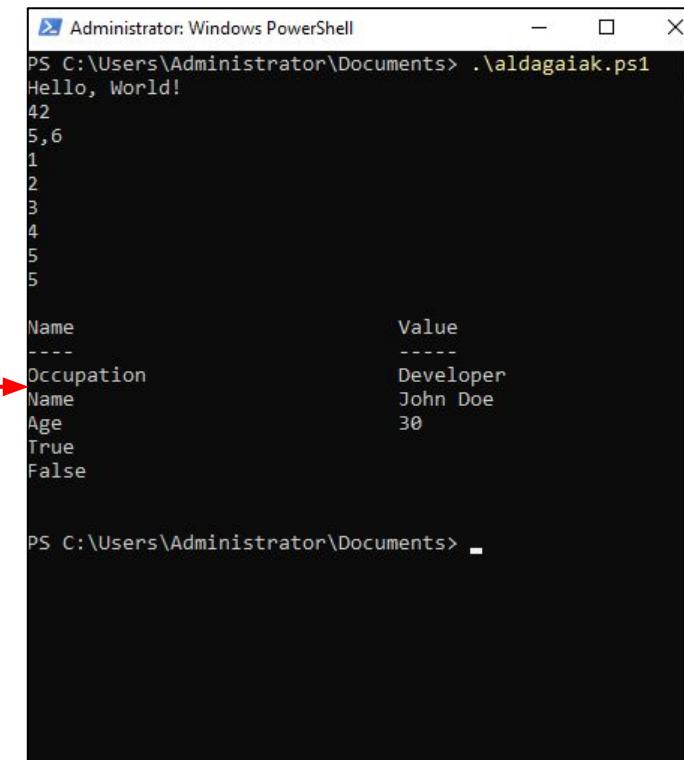


```

aldagaiak.ps1 - Notepad
File Edit Format View Help
# Declaring variables
$string = "Hello, World!"
$integer = 42
$float = 5.6
$array = 1,2,3,4,5
$arrayCount = $array.Count
$hashTable = @{
    Name = "John Doe"
    Age = 30
    Occupation = "Developer"
}
$booltrue = $true
$boolfalse = $false

# Output variables
Write-Output $string
Write-Output $integer
Write-Output $float
Write-Output $array
Write-Output $arrayCount
Write-Output $hashTable
Write-Output $booltrue
Write-Output $boolfalse
  
```

1 item 1 item selected 461 bytes Ln 23, Col 24 100% Windows (CRLF) UTF-8



```

PS C:\Users\Administrator\Documents> .\aldagaiak.ps1
Hello, World!
42
5,6
1
2
3
4
5
5

Name                           Value
----                           -----
Occupation                     Developer
Name                           John Doe
Age                            30
True                           True
False                          False

PS C:\Users\Administrator\Documents>
  
```

3

Operadoreak eta kontrol-egiturak

Operadoreak eta kontrol-egiturak

- **Eragiketa aritmetikoak**
 - Batuketak, kenketak, biderketak eta zatiketak.

```
$a = 10
$b = 20
$c = 30
$d = 40
$sum = $a + $b
$res = $b - $a
$product = $a * $b
$div = $b / $a
```

Operadoreak eta kontrol-egiturak

- Array-ak kontrolatzen

```
$array = @(1,2,3,4,5)  
Write-Output $array.count # counting  
Write-Output $array[0] # indexing  
$array += 6 # add element  
Write-Output $array
```

PowerShell-eko array-etan defektuz ezin dira elementuak ezabatu. Alternatiba bezala, beste array mota batzuk erabili behar dira. Guk klasean ez ditugu ikusiko.

Workaround bezala, beste array bat sortzea da, ezabatu nahi dugun elementua array berrian sartu gabe.

Operadoreak eta kontrol-egiturak

- **Baldintzazko adierazpenak (conditional statements)**
 - Aldagaiak nolan konparatu
 - **-gt** (greater than)
 - **-lt** (less than)
 - **-ge** (greater than or equal)
 - **-le** (less than or equal)
 - **-eq** (equal)
 - **-ne** (not equal)
 - **if, else, elseif**

```
if ($a -eq $b) {  
    Write-Output "$a is equal to $b"  
} elseif ($a -lt $b) {  
    Write-Output "$a is less than $b"  
} elseif ($a -ge $b) {  
    Write-Output "$a is greater than or equal to $b"  
} else {  
    Write-Output "Error!"  
}
```

Operadoreak eta kontrol-egiturak

- **Baldintzazko adierazpenak (conditional statements)**
 - Konparaketak konkatenatzen (and, or)
 - -and
 - -or

```
if ($a -eq $b -and $c -eq $d) {  
}  
  
if ($a -eq $b -or $c -eq $d) {  
}
```

Operadoreak eta kontrol-egiturak

- **Looping**
 - Simple for loop

```
for ($i = 0; $i -lt 10; $i++) {  
    # Code to execute in each iteration  
    Write-Host "Iteration number: $i"  
}
```

- Looping through an array

```
$numbers = @(1, 5, 3, 8)  
  
foreach ($number in $numbers) {  
    # Code to execute for each item in the collection  
    Write-Host "Current number: $number"  
}
```

Operadoreak eta kontrol-egiturak

- **Looping**
 - **while**

```
$counter = 0

while ($counter -lt 5) {
    # Code to execute as long as the condition is true
    Write-Host "Counter value: $counter"
    $counter++
}
```

- **do-while**

```
$number = 10

do {
    # Code to execute at least once, then repeatedly as long as the condition is true
    Write-Host "Number value: $number"
    $number--
} while ($number -gt 0)
```

4

Funtzioak eta cmdlets

Funtzioak eta cmdlets

- **Funtzio edo cmdlet batek hainbat zati ditu:**
 - Funtzioaren definizioa “function” eta izena.
 - Sarrera parametroak eta beraien mota eta izena.
 - Funtzioak exekutatuko duen kodigoa.
 - Return (beharrezkoa bada bakarrik).

```
function Print-Text {  
    param (  
        [string]$text  
    )  
    Write-Output $text  
}  
Print-Text -text "Hello, World!"
```

```
function Print-Text {  
    param (  
        [string]$text  
    )  
  
    Write-Output $text  
    return $text  
}  
  
$result = Print-Text -text "Hello, World!"  
Write-Output $result
```

Eskerrik asko

Xabier Etxezarreta

xetxezarreta@mondragon.edu

Goiru, 2; 20500 Arrasate - Mondragón (Gipuzkoa), Spain

Tel. : +(34) 647503682 / +(34) 943794700 + Ext. 8119

info@mondragon.edu