

Unreal Engine Bootcamp Notes

Keyboard Shortcuts

Unreal Engine

Esc Unselect All	F1 Docs	F2 Rename	F3	F4 Actor Details	F5	F6	F7	F8 Possess	F9 Shot Tgt. Break	F10 Step	F11 Fullscreen Immersive	F12
~ Console L ↔ W	1! Place C. Scaler	2 Paint C. 2 Vector	3 Land. C. 3 Vector	4 Foliage C. 4 Vector	5 Brush C. 5 Vector	6^ LK	7^ D. Light	8^ Lighting	9^ L.Cost	0^ S.Cost	- LM Dens.	Backspace
Tab List Open Assets And Tabs	Q Widget Reflector	W Move Dup.	E Set All SM Rotate Power	R Scale Ref. Vector Light Radius Realtime	T Trans. Set Texture	Y Reds	U Texture Coords	I If	O Tgt. Exp. One Minus Tgt. Expand Volumes Open	P Pins Panner Play Open Asset	[Grid Gommo] Grid Gommo
Caps Lock	A Add Select All Of Same Class Attach To Set All	S Tgt. Scroll Set All Key Save Simulac	D Divide	F Focus In All Focus F2 Mat. Func. Find Fog	G Ungroup Group Game View Gp. Sol	H Hide Unhide All	J	K Keep Sim. Set Key RM. Snap First In Level BP	L Lerp Landscapes Set All In Layer	;; Build Lights	' Apply Material Changes	Enter
Shift	Z Undo	X Cut	C C. Mask AJ View Cullions	V Vert. Snap Vector Param	B Bump Find In CB	N Normalize Cycle Nearest New Level	M Make Cur. Lev. Multiply Move to Cut Level	< Prev Key GPU Profiler Prev Cam. Key	> Next Key Compile Shaders Next Cam. Key	/ ? Reset All Emitters Reset Emitter	Shift	
Ctrl	Alt	HAVE YOU SAVED YET?					Red / Bottom Left Green / Bottom Right Blue / Top Right Magenta / Middle Right Yellow / Middle Right	Control Alt Shift Control + Shift Control + Alt	Alt	Menu	Ctrl	

Blender

blender
cheat
sheet

EDIT MODE | HOTKEYS

Esc Cancel Render	F1 Browse	F2 Save As	F3 Save Render	F4 Logic Panel	F5 Materials Panel	F6 Textures Panel	F7 Object Panel(s)	F8 World Settings	F9 Editing Panel	F10 Render Settings	F11 Show last Render	F12 Render
` Layer 1 (front) (back)	1 Layer 2	2 Layer 3 (right) (left)	3 Layer 4	4 Layer 5 (perspective/ortho)	5 Layer 6	6 Layer 7 (top) (bottom)	7 Layer 8	8 Layer 9	9 Layer 10	- Backspace		
Tab Object/Edit SELECT MODE: Vert/Edge/Face	Q Specials Menu	W Extrude Edge Spec. Crease	E Rotate Loop Cut	R Triangulate	T Split	Y Axis	U UnWrap UV	I Keyframe	O Prop'l Edit	P Separate	(Enter)
Caps Locks	A Select All / Deselect All	S Scale	D Draw Mode Duplicate	F Fill (Invert Faces) Camera Fly Face Specials	G Move	H Hide Unhide	J Tri > Quad	K Link	L Select Linked	;	' #	
Shift	Z Axis Shading (wire/solid)	X Delete	C Center on 3D Cursor	V Rip	B Box/Brush SELECTION	N Properties Normals Out Normals Inside	M Mirror Transform Merge	' Pivot on Selection	/	Shift		
Ctrl	Win	Alt	Space Add... Manipulator Change(translate, rotate, scale, combo) Orientation Change(global, local, normal)	Alt Option	Win	Menu	Ctrl					

Print	Scroll	Pause
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Blender 2.4x Basic shortcut keys			
Num Lock	/	*	- Zoom Out
7 Top	8 View Up	9 + Zoom In	
4 View Lft	5 Perspective	6 View Rgt	
1 Front	2 View Dwn	3 Side	
0 Camera	.	Center on Selection	Enter

MOUSE NAVIGATION

Select

Rotate
View

Pan
View

Zoom
In/Out

CTRL+ALT+0
Snap Camera
to VIEW

blender
cheat
sheet

OBJECT MODE | HOTKEYS

Esc Cancel Render	F1 Browse	F2 Save As	F3 Save Render	F4 Logic Panel	F5 Materials Panel	F6 Textures Panel	F7 Object Panel(s)	F8 World Settings	F9 Editing Panel	F10 Render Settings	F11 Show last Render	F12 Render
` Layer 1 (front) (back)	1 Layer 2	2 Layer 3 (right) (left)	3 Layer 4	4 Layer 5 (perspective/ortho)	5 Layer 6	6 Layer 7 (top) (bottom)	7 Layer 8	8 Layer 9	9 Layer 10	- Backspace		
Tab Object/Edit MODE	Q Boolean Menu	W Clear Rotat.	E Cam. Track	R U Single User	T Keyframe	Y Game Mode	U P (Enter	O Game Mode	P (Enter	(Enter)	
Caps Locks	A Select All / Deselect All	S Scale	D Draw Mode Duplicate	F Fill (Invert Faces) Camera Fly Face Specials	G Move	H Hide Unhide	J Tri > Quad	K Link	L Make Local	;	' #	
Shift	Z Axis Shading (wire/solid)	X Delete	C Center on 3D Cursor	V Vertex Paint	B Box/Brush SELECTION Zoom Border	N Properties Normals Out Normals Inside	M Mirror Transform Merge	' Pivot on Selection	/	Shift		
Ctrl	Win	Alt	Space Add... Manipulator Change(translate, rotate, scale, combo) Orientation Change(global, local, normal)	Alt Option	Win	Menu	Ctrl					

Print	Scroll	Pause
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Num Lock	/	*	- Zoom Out
7 Top	8 View Up	9 + Zoom In	
4 View Lft	5 Perspective	6 View Rgt	
1 Front	2 View Dwn	3 Side	
0 Camera	.	Center on Selection	Enter



Poster ver. 1.53 for blender 2.76

giudansky.com

short cuts

infographicmap

Learn Blender 3d in a single sheet poster.

An infographic tribute to blender made by giudansky.com



First thing you need to learn. Add a monkey head on top of that wonderful cubel

shift + A = Add object
object view, edit view, node editor

Rotate
view
shift + move
view
Zoom
view
shift + B = crop zoom view

Pan
view
ctrl + alt + Q = 4 sides view

view

N = Properties panel

T = tool shelf panel
ctrl + scroll = scroll tabs values +/-
alt = multiple object value change
divide view
ctrl + swap view

rotate

top 7 8 9
front 4 5 6
right 1 2 3
0 = cancel
orthogonal
opposite view
align view to active
opposite view
zoom on selected

camera / user persp.

Select object
shift + add = add to selection

Isolation mode
alt + f10 = Full screen
shift + space = full view
shift + F = Navigation mode
tab = activate gravity

camera

ctrl + 0 = Active camera
set view on selected camera
ctrl + alt + 0 = set camera on current view

select - organize

A = Select all
ctrl + x2 = unselect
ctrl + I = invert select
B = border select
C = brush select
ctrl + brush size = lasso select
alt + loop select
ctrl + alt + ring select

cursor, origin, orientation

Cursor move
shift + S = cursor align
shift + C = reset 3d cursor

alt + C = set origin view
alt + space = orientation set
view, gimbal, normal, global, local

space = Search functions

shift + R = repeat last action
The easiest way for repetitive actions

ctrl + L = make links from active to selected
Copy positions, scale, rotations, uvs, modifiers, and more, from active object to selected.

ctrl + C = Copy attributes

tab = Edit / Object mode interaction mode
ctrl + tab

modeling (edit mode)

edit window
ctrl + F = face
ctrl + E = edge
ctrl + V = vertex
alt + F = Create face or edge between selected
J = Connect vertex path
V = Rip
ctrl + R = Loopcut and slide
E = Extrude
ctrl + x/y/z = on axis
ctrl + click extrude

shift + K = Knife cut a face
ctrl + snap on mid
z = cut through
C = angle const.
ctrl + B = Bevel faces or edges
V = bevel vertex
alt + M = Merge
P = Separate from mesh
alt + R = Spin selected
Spin works perpendicular to the view
In edit mode add vertices to the shape mesh

mustload - addons

materials

ctrl + Q = Material utils menu - assign or select by material
F = connect selected nodes
T = node offset direction left/right
Basic material node example
GLASSY REFRACTION
DIFFUSE REFRACTION
MIX SHADER
MATERIAL OUTPUT
shift + delete = delete material
Shaders must be always placed at the end before mix shader

ctrl + space = node wrangler menu
ctrl + shift + preview = preview selected node

transform

G = Move
R = Rotate
S = Scale
ctrl + M = mirror
shift + D = duplicate
ctrl + L = copy linked to scene
alt + D = duplicate linked
alt + C = convert to curve, mesh...

script mode

F = Brush size
shift = brush strength
ctrl + add / subtract
shift = soft

texture painting

S = Color picker
add color switch
move stencil
scale stencil

grease pencil

D = Draw stroke free hand
ctrl + D = draw stroke line
D = draw stroke poly line
Erase

render

ctrl + B = border render
ctrl + alt + B = reset border
Render = f12
f11 = show last render
f3 = Save image

IT TOOK HOURS TO MAKE, IF YOU LIKE BUY ME A BEER ON GIUDANSKY.COM

Reference Keys

(Untested) – Means I haven't used it. Information taken from the internet, might be incorrect.

(Unknown) – No complete necessary information can be found, such as requirements or licencing.

(Suspicious) – From unknown or unreliable source. Ignore or have caution. Most likely from a Google Drive link.

(Self-hosted) – Can be installed in your own server/machine. Very cheap compare to paying for third party. Sort of like installing a Minecraft server.

(Bias) – Information included may be bias.

(Old) – Outdated information.

“Quotations” – Copied and pasted text from the internet. Most likely from the product or service website.

Marketplace

FAB

3 free assets every month. Search for Quixel for high resolution assets and environments.

Megascans are big scans of real environments, you can download different quality versions. Search for Paragon for characters meant to be used for a shelved game. FAB plugin on Unreal will always filter content for Unreal Engine. The website FAB is universal for Unreal and Blender, I think.

Sketchfab

Gumroad.com

Cosmos.leartesstudios.com

Set of free assets. High quality, no generative AI

Humble Bundle

Not a store for game assets, but occasionally sells game assets in bundles that you can claim in other stores like FAB, Gumroad and Leartes Studios.

Fanatical (Untested)

<https://www.fanatical.com/en/>

AmbientCG

<https://ambientcg.com/list?sort=popular>

Free materials with Creative Commons 0 Licences. No credit necessary.

Polyhaven (Untested)

<https://polyhaven.com/>

Public 3D Asset Library.

Other Softwares

Terrain Generation Tool

Both World Machine and Quadspinner have free versions but both exports are only limit to low resolutions like 8K. Megascans from real world terrains can be used instead of generating one.

World Machine (Untested)

<https://www.world-machine.com/>

Quadspinner Gaea

<https://quadspinner.com/>

Houdini (Untested)

<https://www.sidefx.com/>

<https://www.sidefx.com/products/houdini/>

Touch Designer (Untested)

Build interactive applications. Can be connected with Unreal.

<https://derivative.ca/UserGuide/TouchDesigner>

https://derivative.ca/UserGuide/Getting_Started_With_TouchDesigner

Marvelous Designer (Untested)

Digital Clothing for Humans. £280 a year.

<https://marvelousdesigner.com/>

Touch OSC

Modular Control Interface. Can be use to control components in Unreal. Available for mobile devices too.

<https://hexler.net/touchosc>

<https://hexler.net/products>

Software to check protocol in networking.

<https://hexler.net/protokol>

Unreal OSC Plugin Overview

<https://dev.epicgames.com/documentation/en-us/unreal-engine/osc-plugin-overview-for-unreal-engine#oscservers>

Blender

Free and opensource 3D modelling software.

<https://www.blender.org/download/>

Planning Software

Trelby. Free opensource screenplaying writing software.

<https://www.trelby.org/download/>

Storyboarder. Free storyboarding software. Requires email. Their GitHub has older versions that you can download directly.

<https://wonderunit.com/storyboarder/>

Storyboard angles.

<https://storyboardart.org/storyboard-tutorials/camera-angles-for-storyboard-artists/>

GIMP. Free and opensource. Photoshop alternative. UX sucks though.

<https://www.gimp.org/downloads/>

Krita. Free and opensource. Painting software.

<https://krita.org/en/>

Inkscape. Free and opensource. Vector graphics. Adobe illustrator alternative.

<https://inkscape.org/>

Project Management Tools (All Untested except Discord/Miro/OpenProject/Nextcloud)

Jira

Trello

Notion

GitHub Jira

Google Sheets

Air Table

Kasana

Monday.com

Communication

Discord

Slack

Graphical Planning

Miro

Mural

(Self-hosted) Project Management Software

OpenProject

<https://www.openproject.org/>

<https://www.openproject.org/download-and-installation/>

Includes Git and Nextcloud integration. Knowledge base. Steep learning curve.

(Self-hosted) Cloud Service

NextCloud

<https://nextcloud.com/install/>

<https://devarshi.dev/blog/self-hosting-your-own-cloud-storage-on-aws-using-nextcloud>

Recommended installing it through snapd. Takes only 1 minute to set up with these two commands.

- sudo apt install snapd
- sudo snap install nextcloud
- Go to localhost:80 and set your admin credentials.

By default, it uses http. Recommend to install certbot with Let's Encrypt as they recently started certifying IP addresses instead of domains. Alternatives are self-signed and signing through a third party certificate manager.

3D Scanning Apps

Polycam (Untested)

<https://poly.cam/>

*Uses LiDAR. Requires iPhone with LiDAR. iPhone 12-16, Pro and Pro Max Only.

Scaniverse (Untested) (Unknown: contrasting information, may be wrong)

<https://scaniverse.com/>

Uses Gaussian Splatting and LiDAR. Check requirements. Create Mesh instead of Splat to export models for game development.

Epic Games Reality Capture/RealityScan (Untested)

<https://www.realityscan.com/en-US/download>

Gaussian Splatting software. In the past, RealityCapture is the Desktop Application and RealityScan was the Mobile Application, but they recently rebranded both into RealityScan, I think.

Unreal Engine / PostShot UE5 Plugin / Reality Capture / Gaussian Splat Tutorial

<https://www.youtube.com/watch?v=qb2owEDMPes>

MetaHumans (Old)

Old tutorials. Do not use!

<https://dev.epicgames.com/documentation/en-us/metahuman/metahuman-documentation>

<https://dev.epicgames.com/documentation/en-us/metahuman/downloading-metahumans-with-quixel-bridge>

<https://dev.epicgames.com/documentation/en-us/metahuman/exporting-metahumans-to-unreal-engine-5>

When using the browser cloud version of MetaHumans, you can find and import your metahumans by the Quixel Bridge plugin. You'll need to login to your Epic Game's account.

5.6 has a plugin for metahumans. No cloud version needed anymore for previous versions.

Face Scanning

RealityScan Download

<https://www.realityscan.com/en-US/download>

Face Scanning Tutorial (Untested)

<https://dev.epicgames.com/community/learning/tutorials/Ovd2/capturing-reality-scan-yourself-for-mesh-to-metahuman>

Google Maps Data

Cesium plugins for Unreal and Unity. (Untested)

<https://cesium.com/>

Stream Google maps data directly into Unreal.

Download Google Earth data with Injection

<https://www.youtube.com/watch?v=7YRusnTWXjw>

<https://www.youtube.com/watch?v=X6Q7dbtXVZQ>

<https://github.com/eliemichel/MapsModelsImporter/releases/tag/v0.7.0>

It wouldn't let me inject it with Chrome or Edge. I used Chromium instead. There should be older versions, but the latest version as of 10/05/2025 should work.

<https://commondatastorage.googleapis.com/chromium-browser-snapshots/index.html?prefix=Win/1226644/>

Motion Capture

Facial Motion Capture requiring iPhone/iPad with TrueDepth Sensor

<https://dev.epicgames.com/documentation/en-us/unreal-engine/recording-face-animation-on-ios-device-in-unreal-engine>

Facial Motion Capture with MetaHumans Depth Processing Plugin (Untested)

Requires UE5.6 and higher. No Iphone required, only video.

<https://www.youtube.com/watch?v=Q0LEzkHqcoU>

Facial Motion Capture with Phiz (Untested)

<https://github.com/SpookyCorgi/phiz>

Nvidia Omniverse Audio2Face (Untested)

Audio2Face is already included in Unreal Engine. It detects emotion from the audio itself and changes the facial expression to match it. It will lip-sync with the audio.

<https://docs.omniverse.nvidia.com/audio2face/latest/overview.html>

Radical Motion

AI motion capture and real-time 3D content creation. Real-time capture may lag from 2-5 seconds.

Radical Motion Tutorial Playlist:

https://www.youtube.com/watch?v=h3F6m_xWsUw&list=PLxq2F51IkO36QJk-eHVWR2rj6s5h5NdVd&index=2

iPiSoft

<https://ipisoft.com/>

Uses iPi Recorder to record motion capture and iPi Motion Studio to clean up and export.

Compatible with Xbox Kinect. Personal opinion: not very accurate with one Kinect and takes a long time to clean up a 2 minute animation. Can be exported to various bone structures such as Manny and MetaHumans. Licences can be very expensive ranging from \$200 to \$2000.

Depth Sensing Cameras (Untested)

https://docs.ipisoft.com/Depth_Sensors_Comparison

<https://www.intelrealsense.com/beginners-guide-to-depth/>

<https://www.orbbec.com/products/tof-camera/femto-bolt/>

iPiSoft Motion Capture Studio Tutorial

https://www.youtube.com/watch?v=7Ah_O0Fgpmg

Move.ai (Untested)

Other Hand Tracking / Motion Tracking Components (May not be related to Unreal)

Leap Motion (Untested)

Known uses for Vtuber's software and electronics.

<https://www.ultraleap.com/product/ultraleap-3di/>

Phidgets (Untested)
For electronics.
<https://www.phidgets.com/>

DMX

Type of lights that could be imported to Unreal. Including manufacturer and model. Account needed.

<https://gdtf-share.com/>

(Lighting Desk) EOS Family v3 download. Control lights within Unreal Engine.

<https://www.etccconnect.com/All-Eos-Software/?LangType=1033>

Link to direct Download:

<https://www.etccconnect.com/WorkArea/DownloadAsset.aspx?id=10737518995>

FAB DMX Previs Sample

<https://www.fab.com/listings/5ce617bc-b926-4db5-936b-a0733a5da72d>

James Simpson DMX Unreal 5 Youtube Playlist (Bias)

https://www.youtube.com/playlist?list=PLcFEObd_1GdxZazpyi153kNCYpDZCKDHe

Source Control and Collaboration

Multi-User Editing (Untested)

<https://dev.epicgames.com/documentation/en-us/unreal-engine/getting-started-with-multi-user-editing-in-unreal-engine>

Pixel Streaming

Pixel Streaming Overview

<https://dev.epicgames.com/documentation/en-us/unreal-engine/overview-of-pixel-streaming-in-unreal-engine>

Getting Started with Pixel Streaming in Unreal Engine

<https://dev.epicgames.com/documentation/en-us/unreal-engine/getting-started-with-pixel-streaming-in-unreal-engine>

Note:

On step 2 - Get the Pixel Streaming Servers, substep 3. get_ps_servers.bat is located somewhere at:
\\Windows\\YourProjectName\\Samples\\PixelStreaming2\\WebServers
in the packaged game directories.

You can pixel stream your entire Unreal Editor too, but I can't get it to load over the internet.

Maybe I misconfigured it.

Git with GitHub

Source: https://www.w3schools.com/git/git_getstarted.asp?remote=github

“

Download Git or Git Desktop GUI:

<https://git-scm.com/>

<https://git-scm.com/downloads/guis>

<https://github.com/apps/desktop>

Git Bash

Simple

Run Git Bash

Find the version:

```
git --version
```

Set credentials:

```
git config --global user.name "YourUsername"
```

```
git config --global user.email "Username@example.com"
```

Initialize Git in current folder:

```
git init
```

Check the Git status and see if it is part of the repo:

```
git status
```

Add a file to the staging environment (replace YourFile):

```
git add YourFile
```

Add all the files to the staging environment:

```
git add --all
```

Make a save-point and move from stage to commit:

```
git commit -m "Make any message here"
```

Check log:

```
git log
```

Advance

Create new branch (replace your-branch-name):

```
git branch your-branch-name
```

Display branches:

```
git branch
```

Switch to the new branch:

```
git checkout your-branch-name
```

Merge current branch with your-branch-name:

```
git merge your-branch-name
```

Delete a branch:

```
git branch -d your-branch-name
```


GitHub

Add a remote repository:

```
git remote add origin https://github.com/your-account/your-repository.git
```

Push the master branch to the origin URL, and set it as the default remote branch:

```
git push --set-upstream origin master
```

Fetch gets all the change history of a tracked branch/repo:

```
git fetch origin
```

Get log from origin and master branch/repo:

```
git log origin/master
```

Show the differences between local master and origin/master:

```
git diff origin/master
```

Merge current branch with specified branch:

```
git merge origin/master
```

Pull is a combination of fetch and merge. It is used to pull all changes from a remote repository into the branch you are working on.

```
git pull origin
```

Push changes to remote origin:

```
git push origin
```

See all local and remote branches:

```
git branch -a
```

See all remote branches only:

```
git branch -4
```

Simple Git Bash Commands

List current directory contents:

```
ls
```

Change directory:

```
cd
```

Make new directory:

```
mkdir
```

GitHub Quick Setup

Create a new repository:

```
echo "# testingtesting1231" >> README.md
```

```
git init
```

```
git add README.md
```

```
git commit -m "first commit"
```

```
git branch -M main
```

```
git remote add origin https://github.com/your-account/your-repo.git
```

git push -u origin main

Push existing repository:

git remote add origin <https://github.com/your-account/your-repo.git>

git branch -M main

git push -u origin main

“

(Self-hosted) Perforce

Free licence includes only a maximum of 5 people.

<https://help.perforce.com/helix-core/quickstart/current/Content/quickstart/overview-of-helix-core.html>

Deploying Perforce on AWS with Marketplace and Cloudformation

<https://help.perforce.com/helix-core/quickstart/current/Content/quickstart/deploy-aws.html>

For Windows clients, I turn Case Sensitive to 'Off'. Otherwise I encounter a 'check-case' validation errors and trigger executions and password errors when submitting. This means that it will only work on Windows, but not Mac or Linux. Maybe I misconfigured it or there's an error with the Cloudformation stack.

When modifying the typemap text file, make sure you indent all the commands. Otherwise it will refuse to save.

Multiplayer/Replication

Unreal Engine - How To Create A Multiplayer Game

5 minute tutorial. Uses the standard 3rd Person Blueprint. There's a bug where the camera does not move for the client when using 5.6 Third Person Blueprint. Using 5.5 or lower is preferred or migrated 5.5 third person blueprint to 5.6 project.

https://www.youtube.com/watch?v=1MA9_U3XRZs

Open World Server (Untested)

<https://www.openworldserver.com/>

Hidden MMO Server in Unreal Engine 5.6 (Untested)

<https://www.youtube.com/watch?v=XEzBqkjEbzc>

How to Open Ports for Multiplayer

<https://dev.epicgames.com/community/learning/tutorials/1E7j/unreal-engine-how-to-open-ports-for-multiplayer-port-forwarding>

Dedicated Server

Compiling Unreal Engine Source code

<https://www.youtube.com/watch?v=2HVNz2XGjUY>

Compiling Unreal Engine Source code documentation

<https://dev.epicgames.com/documentation/en-us/unreal-engine/downloading-source-code-in-unreal-engine>

Setting up a dedicated server tutorial

<https://dev.epicgames.com/documentation/en-us/unreal-engine/setting-up-dedicated-servers-in-unreal-engine>

Lyra sample game

<https://dev.epicgames.com/documentation/en-us/unreal-engine/lyra-sample-game-in-unreal-engine#downloadinglyraforenginesourcebuilds>

Unreal Engine Dedicated server tutorial

<https://www.youtube.com/watch?v=ad5MZLSDAZk>

Unreal Engine Dedicated server tutorial autoconnect

https://www.youtube.com/watch?v=Z_6VcxxR6wc

Dedicated Server Guide (Windows & Linux)

[https://unrealcommunity.wiki/dedicated-server-guide-\(windows-and-linux\)-yoapx62d](https://unrealcommunity.wiki/dedicated-server-guide-(windows-and-linux)-yoapx62d)

Make a program continue to run after log out from ssh

<https://stackoverflow.com/questions/954302/how-to-make-a-program-continue-to-run-after-log-out-from-ssh>

Assuming that you have a program running in the foreground, press Ctrl+Z, then:

```
[1]+ Stopped          myprogram
$ disown -h %1
$ bg 1
[1]+ myprogram &
$ logout
```

If there is only one job, then you don't need to specify the job number. Just use `disown -h` and `bg`.

Unreal Engine Unable to Build Linux Server

<https://forums.unrealengine.com/t/ue5-6-linux-wrong-cross-compile-toolchain/2540791/11>

Turn off UBA

Indeed this is the workaround, but it's better to modify the file in “%AppData%\Roaming\Unreal Engine\UnrealBuildTool” instead of modifying the one in UE installation directory:

```
<?xml version="1.0" encoding="utf-8" ?>
<Configuration xmlns="https://www.unrealengine.com/BuildConfiguration">
  <BuildConfiguration>
    <bAllowUBALocalExecutor>>false</bAllowUBALocalExecutor>
  </BuildConfiguration>
</Configuration>
```

Miscellaneous

Maximo

Free characters and animation. Requires Adobe account.

<https://www.mixamo.com/#/>

Ultra Dynamic Sky (£37.16)

A popular FAB asset. Includes Ultra Dynamic Weather. Good documentation. Very simple and easy to use.

Guide to Snow Effects with Ultra Dynamic Sky | Unreal Engine 5

<https://www.youtube.com/watch?v=Guxc5CWhnC4>

MW Landscape Auto Materials (Free)

FAB asset to automatically set materials for landscapes based on height and terrain.

<https://www.fab.com/listings/6602874e-ef24-48c9-9055-a7ac07384696>

<https://www.youtube.com/watch?v=l9O0yV9EHeM>

Material Function Collection (£8.79) (Untested)

<https://www.fab.com/listings/09c903af-a86f-4831-8e72-cc10219ab1b3>

Create Normal Maps Online (Untested)

<https://cpetry.github.io/NormalMap-Online/>

Shadow PC (Untested)

<https://shadow.tech/pro/offers/>

Signiant (Untested)

Well-known enterprise only data transfer service.

Unreal Editor Folder Naming Convention Example (Bias)

<https://github.com/Allar/ue5-style-guide>

Blueprint Pastebin

Find or upload Unreal Editor's Blueprints.

<https://blueprintue.com/>

Creating Materials (Unknown) (Warning: SSL Certificate Expired as of now)

“Materialize is a stand alone tool for creating materials for use in games from images. You can create an entire material from a single image or import the textures you have and generate the textures you need.”

<https://www.boundingboxsoftware.com/materialize/>

BPM to Delay Times Cheat Sheet

<https://external-content.duckduckgo.com/iu/?u=https%3A%2F%2Fimgv2-1->

[f.scribdassets.com%2Fimg%2Fdocument%2F440325835%2Foriginal%2F2fa0c3edc2%2F1700860863%3Fv%3D1&f=1&nofb=1&ipt=68cfc78a4fbe008d051c16cb3f810e8a4249ceb9196166231c549b78dadf1364](https://external-content.duckduckgo.com/iu/?u=https%3A%2F%2Fimgv2-1-f.scribdassets.com%2Fimg%2Fdocument%2F440325835%2Foriginal%2F2fa0c3edc2%2F1700860863%3Fv%3D1&f=1&nofb=1&ipt=68cfc78a4fbe008d051c16cb3f810e8a4249ceb9196166231c549b78dadf1364)

Royalty Free Sound Effects Archive (Untested)

<https://sonniss.com/gameaudiogdc/>

UI and UX (Untested)

<https://lawsofux.com/>

<https://www.figma.com/>

AI generated UI

<https://uiverse.io/>

<https://www.beautiful.ai/>

Substrate Materials (Untested)

<https://www.youtube.com/watch?v=3Xp6xa2Wtlc>

Earth and planetary textures (Untested)

<https://www.solarsystemscope.com/textures/>

Aspect Ratio Cheat Sheet

<https://www.wearethefirehouse.com/aspect-ratio-cheat-sheet>

Get 5500 Triple A Unreal Animations for Free (Suspicious: Unknown licencing and download is from Google Drive)

https://www.youtube.com/watch?v=hSSPKF2_3o4

Download Almost 1,800 Unreal Engine 5 Assets (Suspicious: Unknown licencing and download is from Google Drive)

https://www.youtube.com/watch?v=_-03eby70e0

Space Sphere Maps

<https://www.spacespheremaps.com/>

Virtual Production CoSTAR programme (Untested)

Designed to develop the virtual production industry Costar

<https://www.costarnetwork.co.uk/labs/screenlab>

Datamosh Effect (£22.00) (Untested)

<https://www.fab.com/listings/f54fa19f-b19a-4330-88a6-a467f6a00bca>

Greyboxing/Whiteboxing explanation

A draft level built with simple 3D shapes with no details. It is used to prototype and test the level. Similar to kitbashing.

MetaHuman Animation Tool for face and body (Untested)

https://www.youtube.com/watch?v=U2rXGb_0Ir4

Unreal Engine Surface Snapping Guide

<https://unrealdirective.com/tips/actor-snapping-shortcuts>

How to set a FPS limit on a package game?

<https://forums.unrealengine.com/t/how-do-i-set-a-fps-limit-on-a-packaged-game/343010/4>

Scalability Reference

<https://dev.epicgames.com/documentation/en-us/unreal-engine/scalability-reference-for-unreal-engine>

Unreal Apps on IOS

Unreal Remote
Unreal Vcam
Unreal LiveLink

Architecture and Real Estate Software (Untested)

Twinmotion
<https://www.twinmotion.com/en-US/download>
Archiviz
<https://archiviz.io/>

Generative AI (Untested) (No info or research, only hyperlinks)

<https://www.disguise.one/en/products/designer>
<https://lumalabs.ai/>
<https://www.move.ai/>
<https://blogs.nvidia.com/blog/generative-ai-art-for-images-video-3d/>
<https://web.volinga.ai/>
<https://cuebric.com/>
<https://www.naostage.com/en/>

Other Learning Resources

Unreal Getting Started

<https://dev.epicgames.com/community/unreal-engine/getting-started>

Your First Game in Unreal Engine 5. Stack-O-Bot Tutorial. Notes included below.

<https://dev.epicgames.com/community/learning/tutorials/e2V/your-first-game-in-unreal-engine-5>

I think the tutorial is meant to be done on an older version of UE5, but here are the notes on the changes for current UE5. You cannot download the project as a separate file, so you'll have to add it with FAB to your library and create the project to install the files. The project shows the finished tutorial.

The FirstGameInUE5_Source.zip file is located in the StackBot > Content Folder. You'll only need this file for the tutorial.

14:25

In the Landscape Mode - Paint Tab, it won't show the layers created in the Blueprint. You'll need to click on the icon with tooltip 'Create Layers from Assigned Materials'.

43:00 Character Movement

When you have issues with the rotation of your character:

Open the BP_Bot Blueprint and in the details panel of the root component search for "Use controller Rotation Yaw" and turn it to false.

By default it is set to true.

54:40

The colour in the botbase material isn't set as a parameter. Just right-click it and set it as a parameter.

Gamedev.tv (Untested)

<https://www.gamedev.tv/dashboard> (Untested) (Bias)

Unreal Academy (Untested)

<https://academy.unrealengine.com/totara/catalog/index.php> (Untested)

Career (Unknown)

Entrepreneurship Track through GT365 Community

<https://www.gametech365.com/>

UKRI Funding

<https://www.ukri.org/apply-for-funding/>

Unreal Fellowship

<https://www.unrealengine.com/en-US/fellowship>

SpaceWalk

<https://www.gospacewalk.com/>

Some information has been omitted. Please ask your tutors for career resources, especially relating to their line of work.

Reference Material

Kid-a-mnesia Exhibition

<https://store.epicgames.com/en-US/p/kid-a-mnesia-exhibition>

Fortnite and Metallica in Concert! Technical Review and Commentary (Bias)

<https://www.youtube.com/watch?v=acCyxeH86jQ>

Punchdrunk Immersive Theatre

<https://www.punchdrunk.com/about-us/>

Polygon Live LDN

<https://polygon-productions.live/listing/polygon-live-ldn/>

Random Tutorials

Flow Control

<https://dev.epicgames.com/documentation/en-us/unreal-engine/flow-control-in-unreal-engine>

Create Landscapes in Unreal Engine 5 | Beginner Tutorial

<https://dev.epicgames.com/documentation/en-us/unreal-engine/creating-landscapes-in-unreal-engine>

<https://www.youtube.com/watch?v=JSjtHU6xuDE>

Unreal Build: Virtual Production Playlist (Untested)

https://www.youtube.com/playlist?list=PLZlv_N0_O1gYHG5IMW2nP7CEPZuFnTSpX

Unreal Niagara Static Mesh Particles Tutorial

<https://www.youtube.com/watch?v=Amk28ALebeg>

Niagara System Fireflies

<https://www.youtube.com/watch?v=XGeDSD5NVyU>

MetaSound

<https://dev.epicgames.com/documentation/en-us/unreal-engine/metasounds-the-next-generation-sound-sources-in-unreal-engine>

UE5 Create a Skybox

<https://www.youtube.com/watch?v=PWzGDdA4auc>

HDRI (Unknown)

<https://www.ihdri.com/>

Exploring the depths of the new Sky & Atmosphere system

<https://www.youtube.com/watch?v=SeNM9zBPLCA>

What is HDRI?

<https://www.cgibackgrounds.com/blog/what-is-an-hdri>

How to animate skeletal meshes in sequencer

<https://www.youtube.com/watch?v=1hgkTN-L1hA>

Character/Enemy AI youtube playlist

[https://www.youtube.com/watch?](https://www.youtube.com/watch?v=IDZh0epFTRY&list=PL4G2bSPE_8uklDwraUCMKHRk2ZiW29R6e)

[v=IDZh0epFTRY&list=PL4G2bSPE_8uklDwraUCMKHRk2ZiW29R6e](https://www.youtube.com/watch?v=IDZh0epFTRY&list=PL4G2bSPE_8uklDwraUCMKHRk2ZiW29R6e)

Jiggle Physics

<https://www.youtube.com/watch?v=KJOuE1KPM2g>

Black Hole Tutorial

<https://www.youtube.com/watch?v=jmXM07nHoQg>

Black Hole 2 Tutorial

https://www.youtube.com/watch?v=5uVCK_QsLKs

Audio Visualizer Tutorial

<https://www.youtube.com/watch?v=OPdy56oNGkA>

Unreal Engine Creating your own game from scratch

<https://www.youtube.com/watch?v=hjpRZZkEvAI>

MetaSound Tutorial

<https://www.youtube.com/watch?v=SAED1BDA1Qc>

<https://dev.epicgames.com/documentation/en-us/unreal-engine/metasounds-in-unreal-engine>

Widget Tutorial

<https://dev.epicgames.com/documentation/en-us/unreal-engine/building-your-ui-in-unreal-engine>

Recreating the Dreamy Digicam Look in Unreal

<https://www.youtube.com/watch?v=xsy27MCbJWM&t=13s>

How to measure distance

<https://dev.epicgames.com/community/learning/tutorials/70z/how-to-measure-distances-in-unreal-engine>

Unreal Engine Displacement Maps

<https://www.youtube.com/watch?v=4Cfs02Pd6qo>

Unreal Engine Nanite Tessellation for Environments

<https://www.youtube.com/watch?v=gcN3WzKb7Co>

Exporting and packaging a game

<https://www.youtube.com/watch?v=emOsoyHSmAE>

Windows - download the Windows SDK. Mac - requires Mac with XCode.

<https://developer.microsoft.com/en-us/windows/downloads/windows-sdk/>

Exporting to Linux on Windows requires the Linux Toolchain version that matches your Unreal Editor's version number. 5.0 and higher toolchain is here:

https://dev.epicgames.com/documentation/en-us/unreal-engine/linux-development-requirements-for-unreal-engine?application_version=5.5

Pixel Streaming

When using the Pixel Streaming 2 plugin, you do not need to download the Pixel Streaming server files from their GitHub. After you packaged your project, Pixel Streaming server files should already be in \Samples\PixelStreaming2\WebServers.

<https://dev.epicgames.com/documentation/en-us/unreal-engine/pixel-streaming-in-unreal-engine>

Light Baking and Lightmaps

<https://dev.epicgames.com/community/learning/tutorials/KPOx/unreal-engine-light-baking-and-lightmaps-a-step-by-step-ue-guide>

Fix Stretch Textures with World Align

<https://www.youtube.com/watch?v=fv-Ap3CvtKI>

Fake Shadows and Colored Light Function

<https://www.youtube.com/watch?v=eVd9PwiODSc&list=PPSV&index=3&t=25s>

Light Function Atlas

<https://dev.epicgames.com/community/learning/tutorials/Bdvy/unreal-engine-light-function-atlas-5-5-next-level-power-efficiency>

Making A Projector Light in Unreal Engine 5 Using Light Functions

In engine versions in 5.3 or higher, the projection may be rendered in very low resolution. You can change this by putting in "r.LightFunctionAtlas.SlotResolution 512" as a console command. 512 is the resolution size, but it can be higher like 1024, 2048, 4096, 8192, etc.

<https://www.youtube.com/watch?v=eYgMuHTLz10>

spherical texture projection with light functions, light linking, lighting channels

<https://www.youtube.com/watch?v=0vCZcft70AE>

[UE5 Niagara] FIX particles DISAPPEARING + Bounds explained

<https://www.youtube.com/watch?v=4mpyhve75GQ>

How To Change Pivot Points In Unreal Engine 5

<https://www.youtube.com/watch?v=-zYokufHToY>

Make A Professional MainMenu And A Settings Menu In Unreal Engine 5

<https://www.youtube.com/watch?v=NOEM8mVk2r0>

How to create an Adjust Brightness/Gamma Correction Menu in Unreal Engine 5

<https://www.youtube.com/watch?v=-wkb5WV1z2I>

Use Mocap / Kinect Easily with UE5 & TouchDesigner [Tutorial] | Unreal Engine OSC

https://www.youtube.com/watch?v=uUC_pL2IDQk

James Simpson Retarget Mocap Animation Data Youtube Playlist (Bias)

https://www.youtube.com/playlist?list=PLcFEObd_1GdzhH7aLoPyr1lpAvBMeWvcI

Blender Tutorials

Blender Beginner Tutorial - Part 1

<https://www.youtube.com/watch?v=98qKfdJRzr0>

Blender Beginner Tutorial - Part 2: Sword

<https://www.youtube.com/watch?v=xr1lgLAragg>

Beginner Modelling Tutorial Blender

https://www.youtube.com/watch?v=SVl_tlbGrh4

Blender Low Poly Tower Tutorial

<https://www.youtube.com/watch?v=6uNpS3Cqbgk>

The Best Way to Learn Blender in 2025

<https://www.youtube.com/watch?v=tK848ib0BBw>

How to Texture in Blender

<https://www.youtube.com/watch?v=uHCJoNEWjXo>

UV Unwrapping for beginners

https://www.youtube.com/watch?v=qa_1LjeWsJg

Geometry Nodes for Beginners

<https://www.youtube.com/watch?v=aO0eUnu0hO0>

Connect Points to Closest Point in Blender Geometry Nodes

<https://www.youtube.com/watch?v=NzBiXxTXUKk>

Blender Studio

<https://studio.blender.org/welcome/>

Importing from Blender to Unreal

The quick and easy Blender to Unreal Workflow

<https://www.youtube.com/watch?v=MRITf-kzepc>

How to Properly Import Models AND Textures into Unreal Engine 5 from Blender

<https://www.youtube.com/watch?v=9q0Jrgu6wEw>

Tips:

- For Unreal, Import all the Textures

- For Unreal, use NormalDX as it uses DirectX12/11 (Remember Blender uses OpenGL and Unreal uses DirectX. Only difference is normal maps are inverted)

Importing from Blender to Unreal: .udsc method (works with Geometry Nodes but uses a lot of RAM)

Easily Export Blender Geometry Nodes to Unreal Engine 5

<https://www.youtube.com/watch?v=CQb-UxDsS3M>

Easiest Way To Connect Blender With Unreal Engine 5

<https://www.youtube.com/watch?v=pbtt-WsVJWY>

Easiest Way To Connect Blender With Unreal Engine 5 {PART 2}

<https://www.youtube.com/watch?v=6Gq0hv3eJA0>

Licencing Explanation

CC0

<https://creativecommons.org/public-domain/cc0/>

Open source licenses

<https://choosealicense.com/>

Other Notes:

Strange bug fix (Unreal 5.5.4): Sometimes opening up a certain level will crash Unreal Editor, but opening the bugged level from a different level while playing it will fix the crashing. I normally use an 'Open Level (by Object Reference)' node attached to a keyboard key in the level blueprint.