

Introduction

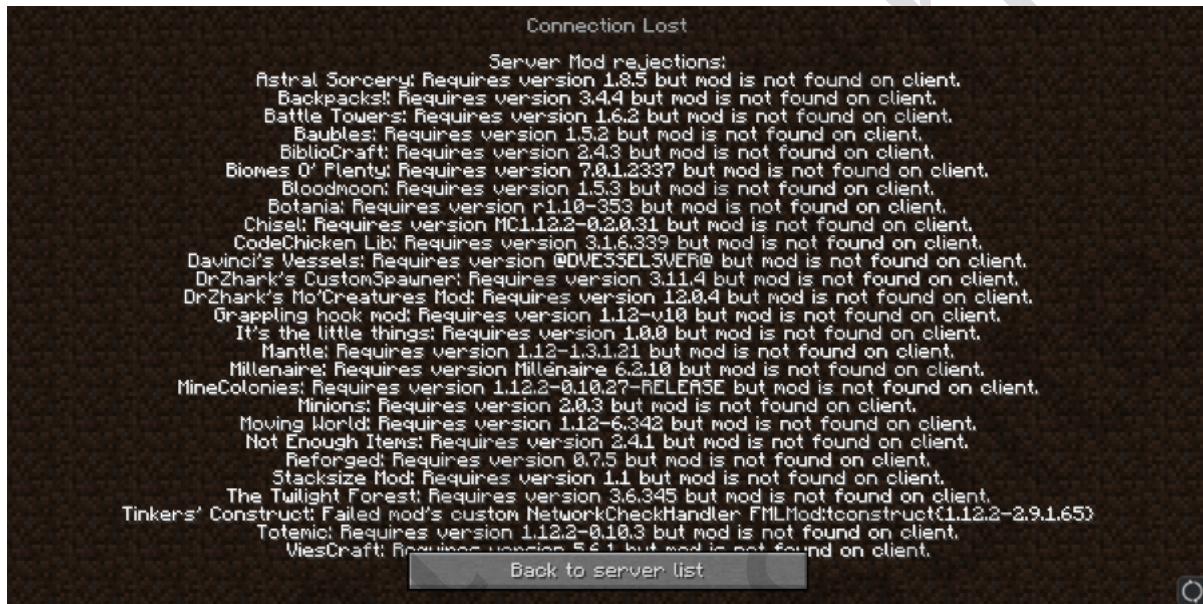
Have you ever wanted to create your own minecraft game and run it on a public server? This class will teach you step-by-step how to do that.

We will create 3 plugins which completely describe the behavior of 3 different games:

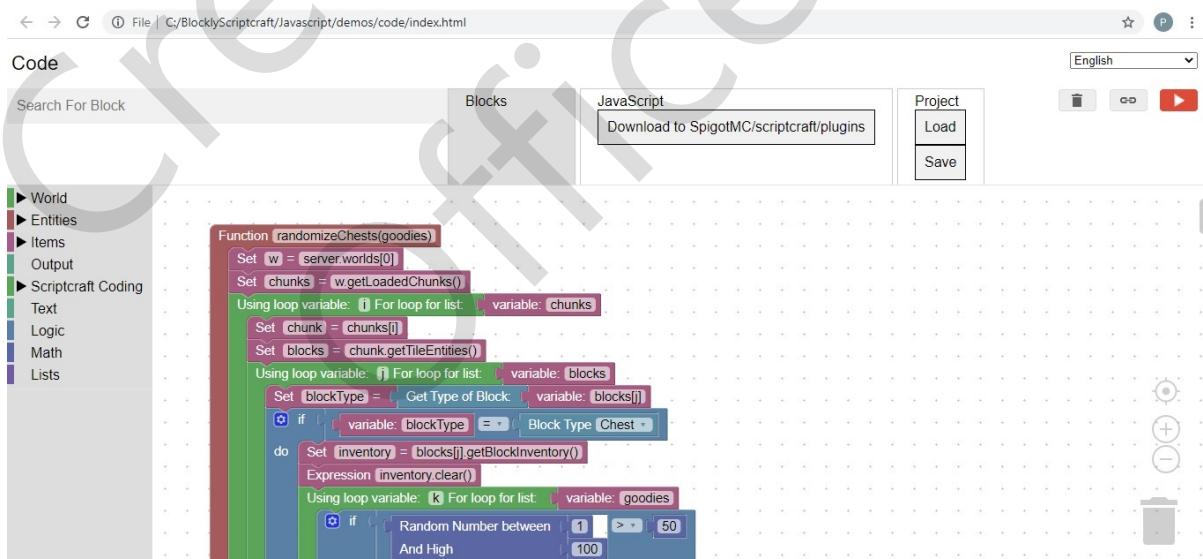
- Spleef
- Bed Wars
- Omaha Beach

Plugins are easier to create and more player-friendly than mods. Plugins are also installed only on the server, which makes them easier to manage.

Typically mods are run off Forge on the client-side and the player needs to install them. The server will kick a player if it doesn't like their list of installed mods:



Mods are also more difficult to create as they are written in java and use eclipse. The plugins we make will be created using a scratch program I wrote called **Blockly-Scriptcraft**. It looks like this:



Some popular plugins you may already be aware of are: **Essentials**, **Grief Prevention**, and **World Edit**.

This course consists of 24: 1 hour classes, 8 classes per game. We will create code in scratch and test the code on your own personal minecraft server.

We will also discuss how to install your game on a public (paid) server, and at that end of each class you will be given access to a minecraft game on a public server that demonstrates the code we discussed in class.

Pre-Requisites

Before registering students should have:

- Windows 10 computer (not MAC or iPad)
- A Mojang minecraft account
- A microphone and speakers (or headset) connected to their computer
- 64-bit git for windows installed on their personal computer from: <https://git-scm.com/download/win>

Suggested age group: 8 to 16 years old

Created with
OfficeSuite

Windows 10 Setup

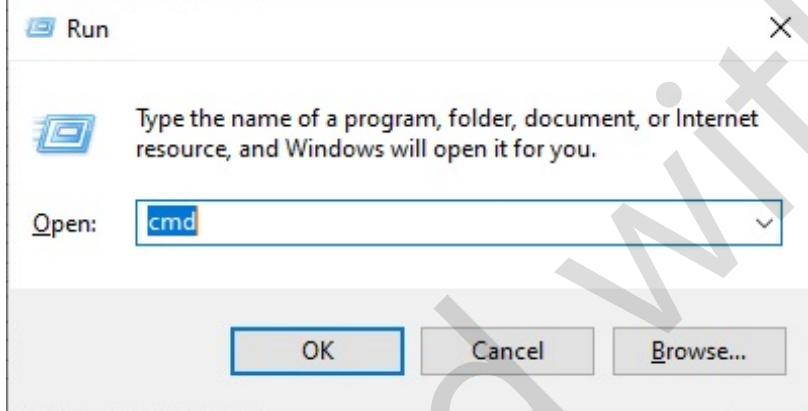
Git

- Download 64-Bit Git for windows: <https://git-scm.com/download/win>
- Run the git install executable

Local Minecraft Server and Blockly

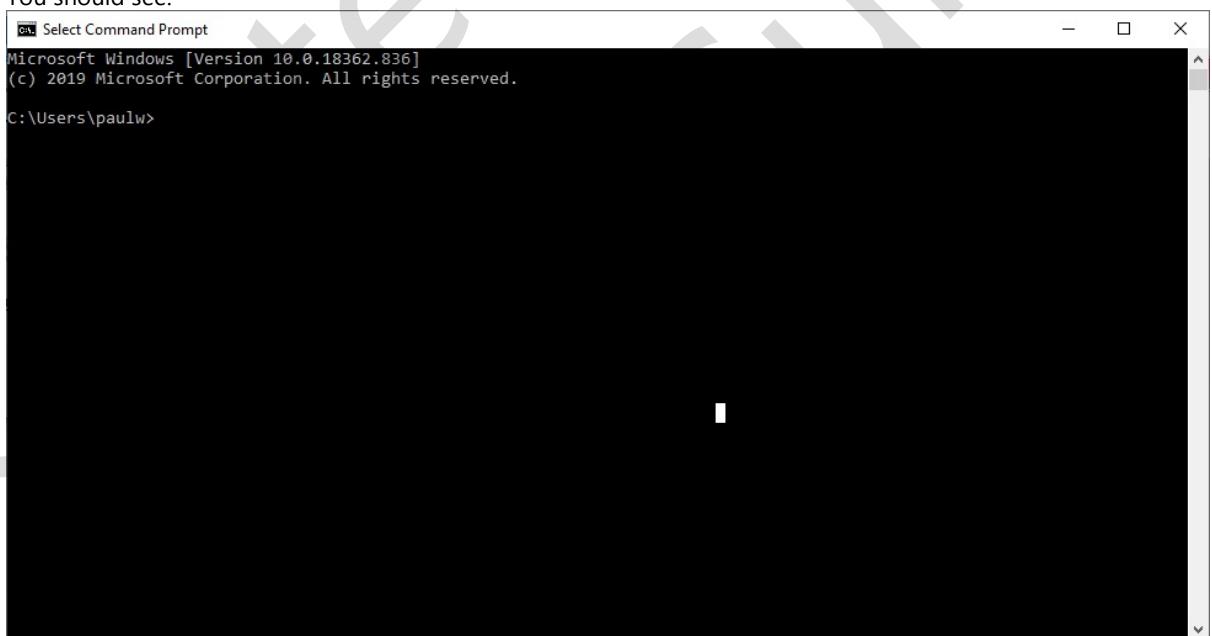
- Open a cmd window
- Hold the Windows key and press the r key

You should see:



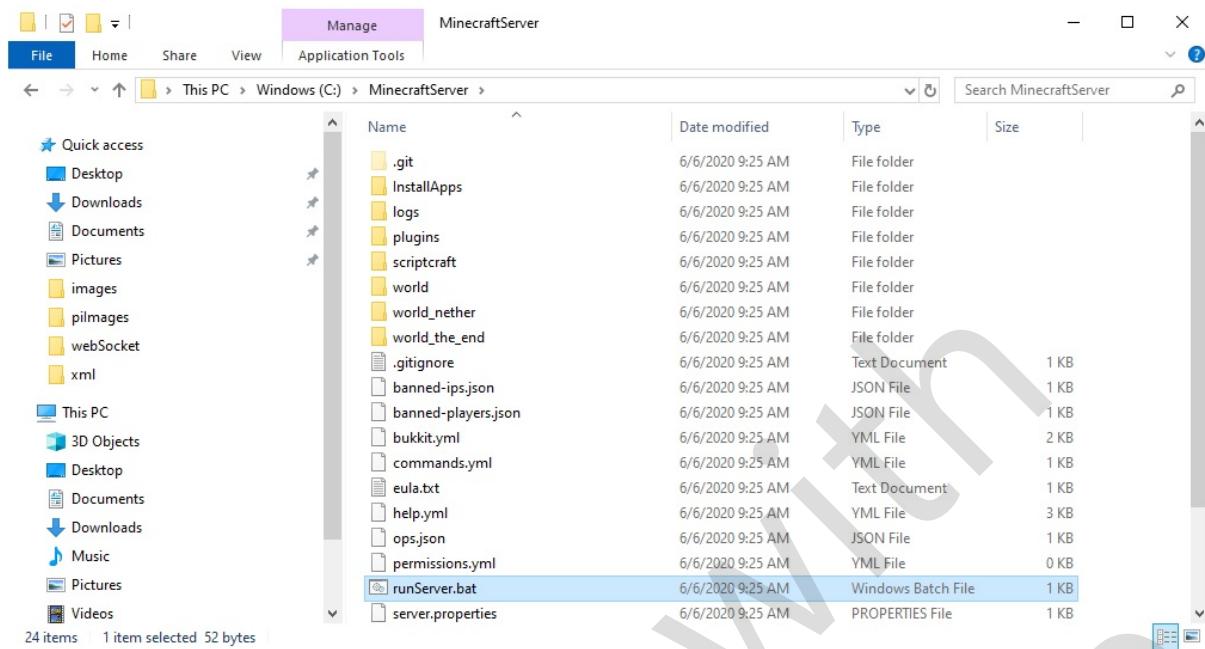
- Enter the command: cmd

You should see:

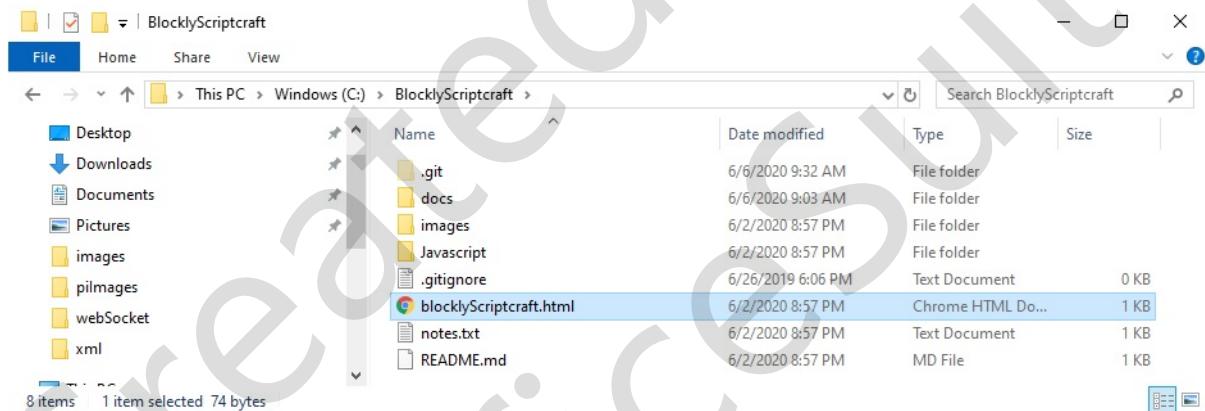


- Enter the command:cd c:\
- Enter the command:git clone https://www.github.com/Paulware/MinecraftServer
- Enter the command:git clone https://www.github.com/Paulware/blocklyScriptcraft

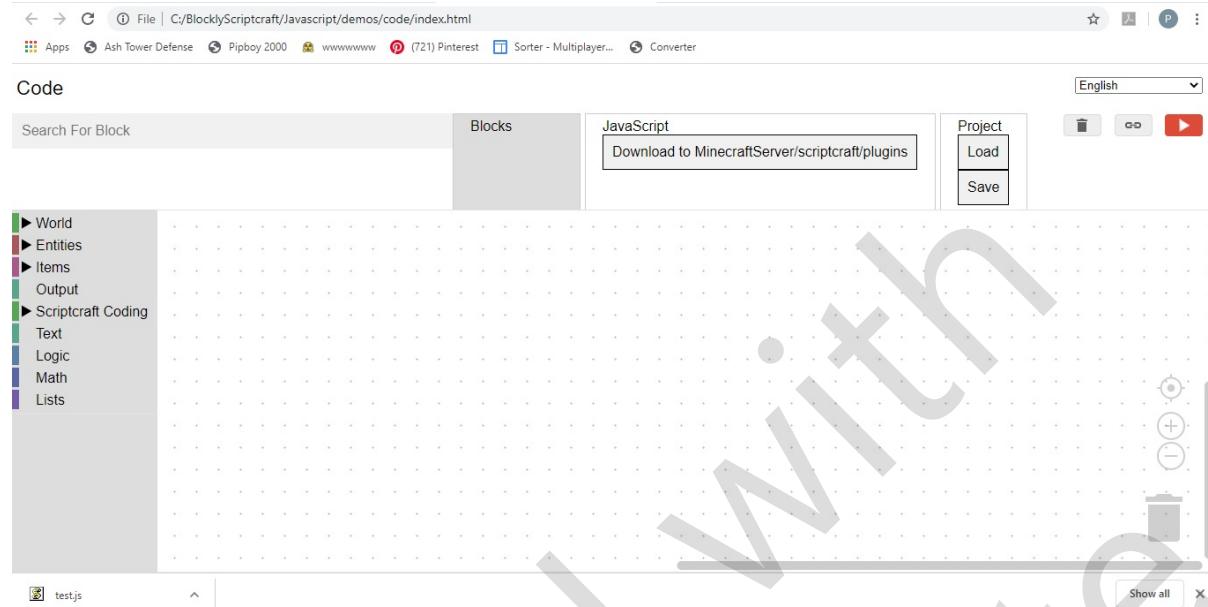
Run the server by double-clicking the runServer.bat file in c:\MinecraftServer from windows explorer like:



Run the scratch program by double-clicking C:\BlocklyScriptcraft\blocklyScriptcraft.html and open using google chrome like:



Blockly-Scriptcraft Overview



Blockly-Scriptcraft will allow you to visually program a minecraft plugin just like you would make a scratch program. This program should be run from the chrome browser only. To open it, double click on the blocklyScriptcraft.html file in the BlocklyScriptcraft directory on your personal computer. On the left side is a menu that can be expanded to show sub-menus. Here you will find the blocks that you need to create your minigame.

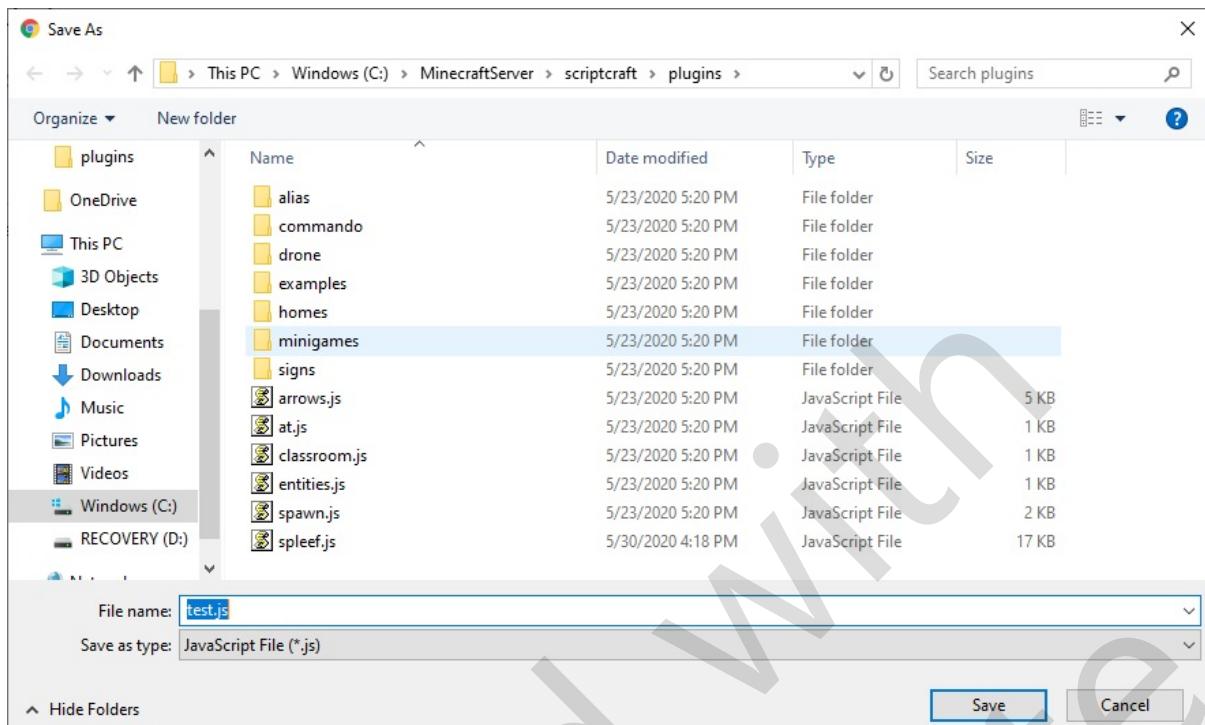
Above the menu is a Search For Block feature that will allow you find any block quickly. To try this out, type "function" into the Search for Block area. It should respond with: Function => Scriptcraft Coding, Functions. This means that the function block is found under the Scriptcraft Coding Menu, subMenu: Functions. To the right of the Search For Block feature are 3 tabs:

- Blocks, which shows the current blocks being created
- Javascript, which shows the javascript and allows you to download into the scriptcraft/plugins directory
- Project, which allows you to save and load the current project block definitions

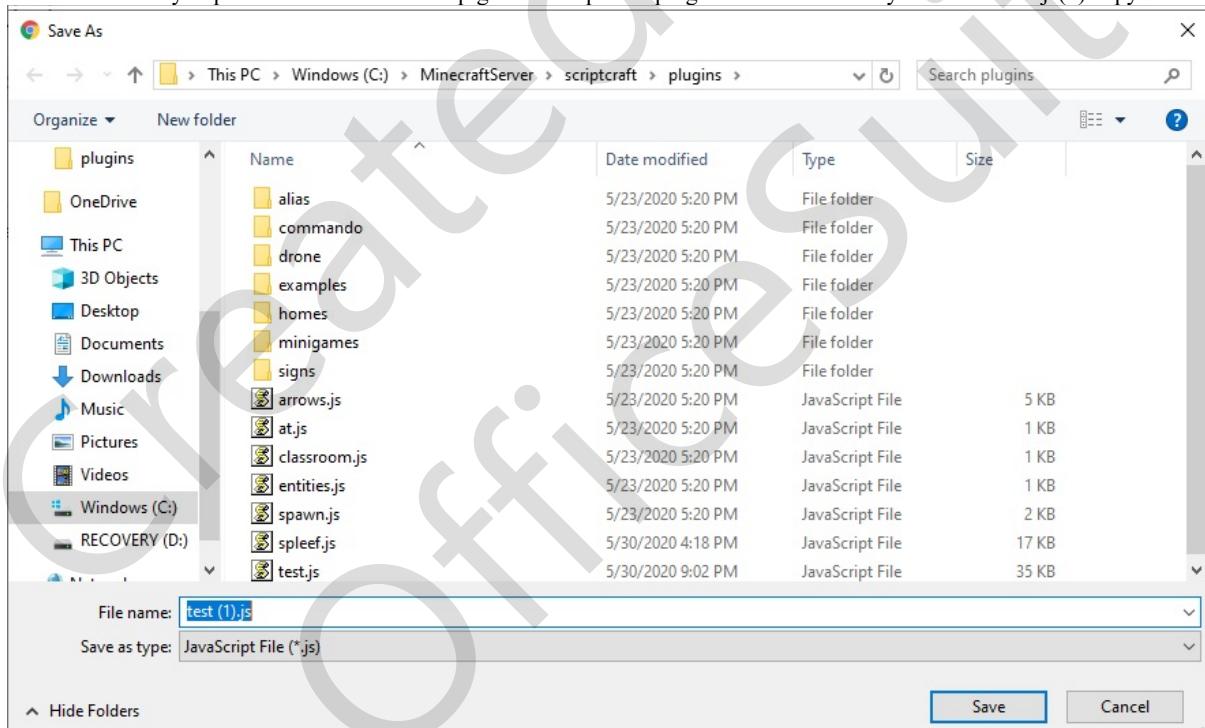
On the lower right is a trash can. You can drag blocks into the trash can to delete them. You can also delete or disable a block by right-clicking on the block and selecting delete or disable.

One useful feature is the duplicate block feature. You can duplicate a block, by right-clicking on the block and selecting duplicate.

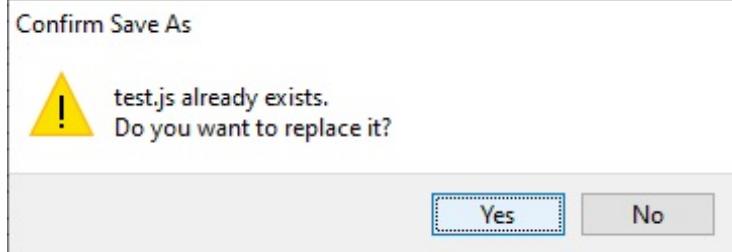
Note: The javascript is automatically created by Blockly-Scriptcraft. You will not need to manually edit this code. After creating your blocks, click on the "Download to SpigotMC/scriptcraft/plugins" button, and save the file as test.js.



The second time you press the "Download to SpigotMC/scriptcraft/plugins" button it will try to save to test.js(1) copy.



Do NOT use this option, it will confuse the server, click on test.js and press ok to overwrite instead



This will place your code in an area that the minecraft server can find
Next, in the server console window, execute the command: reload. This tells the server to read all the plugins that are

available in the scriptcraft/plugins directory.

Be aware that sometimes the server will show an error when you issue the reload command. This is an indicator that there is something wrong with the blocks.

Next run your code by issuing the server command:

```
js test()
```

This allows you to test the function that you have just created in Blockly-ScriptCraft.

Also at this time check the server window, sometimes errors appear when the test function is executed. This is another indicator that there is something wrong with the blocks.

Created with
OfficeSuite

Project 1

Spleef MiniGame

Highlights

- Install your own minecraft server on your personal computer
- Creating a lobby and spawn point
- Select team color and prevent friendly damage
- Protect certain types of blocks from destruction
- Detect game winner
- Reset the game world
- Setup a public web server



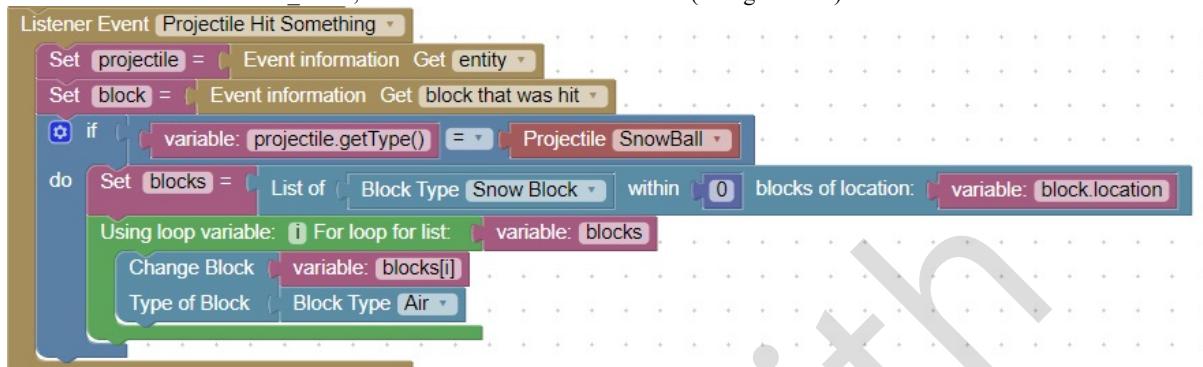
Spleef is a classic minecraft minigame which has players battle on a fragile snow surface above a lava bed.

Special Rules

- Players are only allowed to destroy snow blocks, the plugin will cancel all other block destruction
- This version allows the player to select a team color, any friendly damage is cancelled
- No respawn is allowed, a player that dies will become a spectator on respawn
- The game is over when only one team remains

Snowball Effect

When a snowball hits a snow_block, the snow block should be deleted (changed to air)



To test this effect:

- Open blockly-scriptcraft
- Delete any blocks if there are some
- Select a function block from Scriptcraft Coding and drag it over
- Name the function block: test
- Place the above code in the function block
- Use Search for Block feature to find missing blocks
- Download test.js to your MinecraftServer/scriptcraft/plugins directory
- Run the server by executing runServer.bat located in the spigotMC directory
- Open the server console and type: **reload**
- Run the function with the console command: **js test()**
- Open minecraft, muliplayer and connect to server: localhost
- Give yourself snowballs with the server command: **give @a snowball 16**
- Give yourself snowblocks with the server command: **give @a snowblock 16**
- Lay some snowblocks down
- Throw a snowball at the snowblock, the snowblock should disappear (turn to air)

Spleef Scoreboard

When the first person joins the server after server reset, the scoreboard is created.

Function `spleef()`

```
Execute server command "kick @a restarting server"
Set exports.gameld = null
Listener Event A player joined the server
  Set player = Event information Get player
    if variable: exports.gameld = variable: null
      do Get new scoreboard
        Set Scoreboard Title "Welcome to Spleef yo"
        For all players set score = 0
```

When a player dies, all other players gain a point on their scoreboard

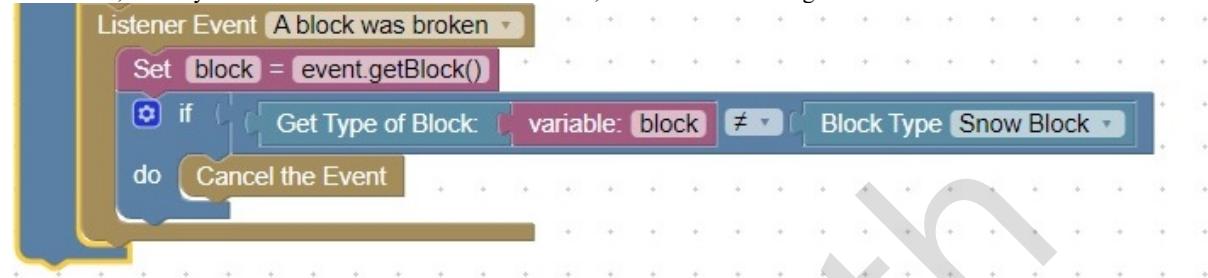
```
Set deadColor = Get Player Data team For: variable: player
Using loop variable: i For loop for list: variable: players
  SendMessage (player.name + " died") To Player variable: players[i]
  if variable: players[i] ≠ variable: player
    do Set teamColor = Get Player Data team For: variable: players[i]
      if variable: deadColor ≠ variable: teamColor
        do Set score = Get Player Data score For: variable: players[i]
          Increment variable: variable: score
          Set Entity Data score = variable: score For: variable: players[i]
          Set score for player: variable: players[i] = variable: score
```

Protect All Blocks except Snow

The protect a block from destruction, use the block break event, and check the type of the block

When the blocktype is one that you want to protect, cancel the event

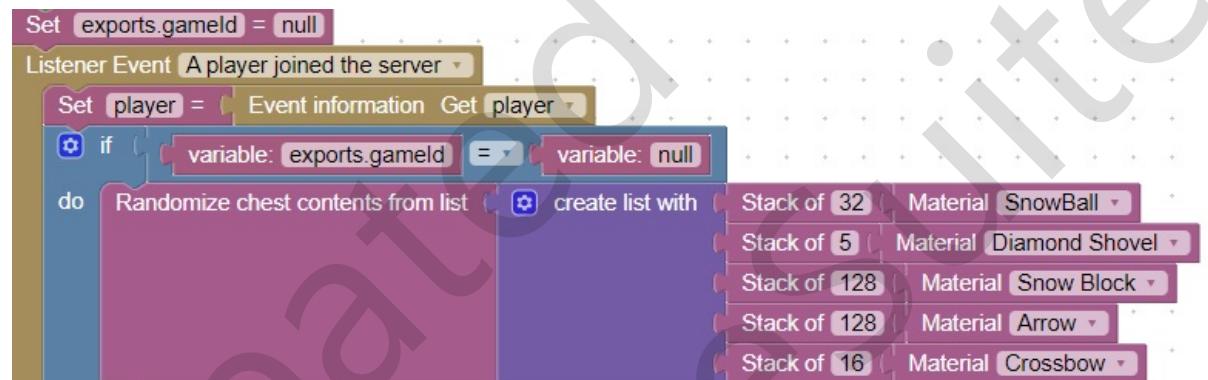
In our case, we only want to allow snow blocks to be broken, so we will use the logic:



Note: This does not protect a block from explosive damage, to do that we need to cancel the explosion based on location.

Randomize Chest Contents

When the first person joins the server, the contents of all chests should be randomized from a list:



Set spawn point

There are 2 server commands that set the spawn point

The world spawn command sets a general location

The setspawn command sets a specific location

When a player joins a server or respawns they are sent to the spawn point.

This should be the location of your lobby.

These commands should be set when the first serverJoin event is triggered after a server reload.

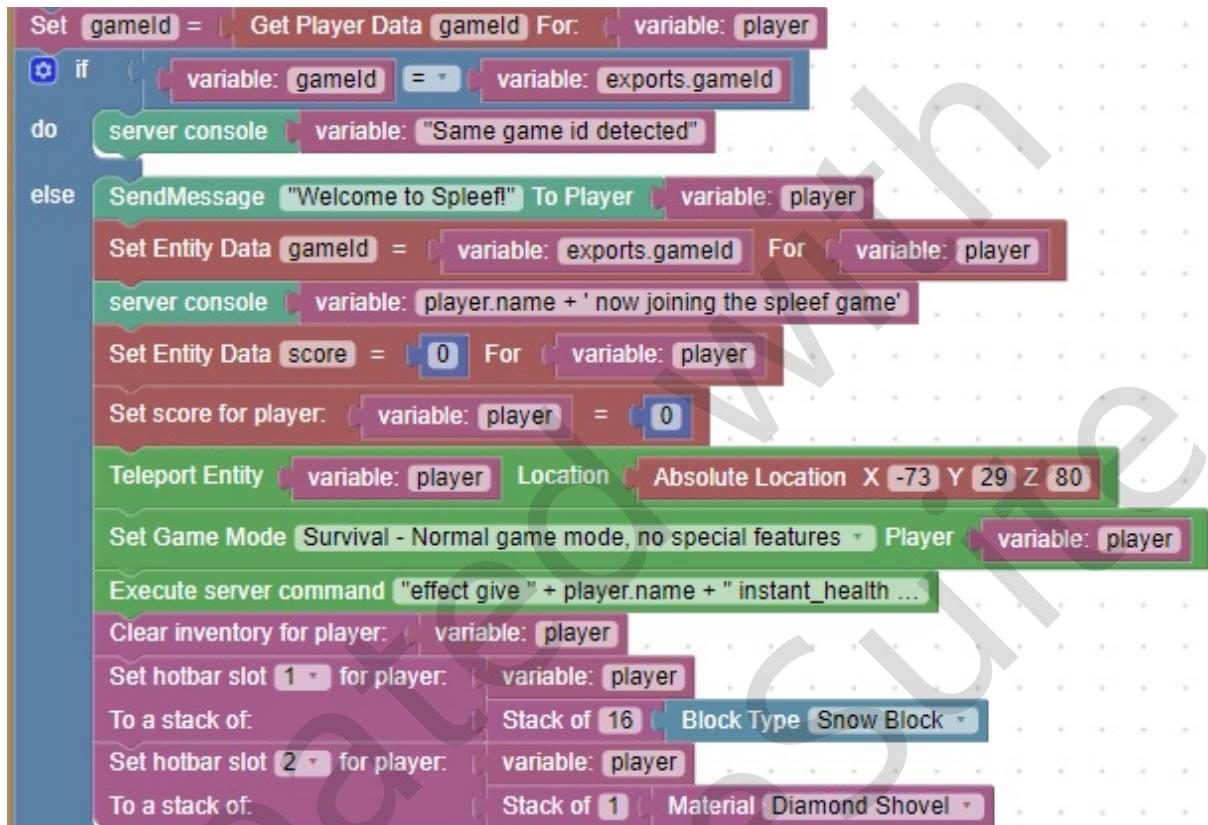
```
Execute server command | setworldspawn -87 14 132
```

```
Execute server command | setspawn -87 14 132
```

Detect if a player is joining this game for the first time

If a player disconnects and reconnects to the server, you may want to have them continue with the same settings they left with.

This code will determine if the player has been in this same game previously.



Spleef Lobby

Most of the work on a lobby is done in the minecraft world itself

The only plugin work is to handle a click on a sign which will then assign a player to a team and teleport them to the team location

This code will handle a mouse click and select a team when a team sign is clicked on

```
Listener Event [Player Mouse Click]
Set [player] = [Event information Get player]
Set [block] = [Event information Get block that was clicked on]
Set [blockType] = [Get Type of Block: variable: block]
If [variable: blockType] = [Material Oak Sign Post]
Do
Set [team] = [Get Sign's Line For Block variable: block Line: 1]
Set Entity Data [team] = [variable: team] For [variable: player]
Server console [variable: player.name + " has selected " + team]
```

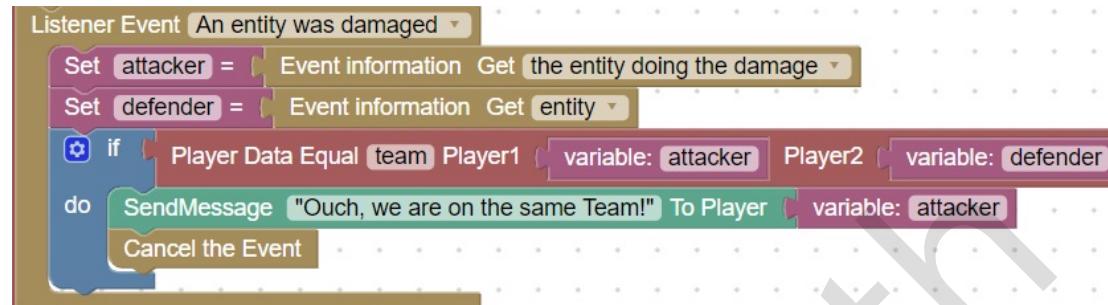
Select team color (at lobby)

When a player clicks on a sign (in the lobby), the second line of the sign indicates which team the player is selecting
Care should be taken to avoid letting a player select a different team (than previously selected).

```
Listener Event [Player Mouse Click]
Set [player] = [Event information Get player]
Set [block] = [Event information Get block that was clicked on]
If [Get Type of Block: variable: block] = [Block Type Sign Post (Oak)]
Do
Set [teamColor] = [to [UPPER CASE v]] Get Sign's Line For Block variable: block Line: 1
If [Value variable: teamColor] In List [variable: ["ORANGE", "RED", "BLUE", "WHITE"]]
Do
If [Get Player Data [team] For: variable: player] = [variable: null]
Do
Set Entity Data [team] = [variable: teamColor] For [variable: player]
Else
Set [teamColor] = [Get Player Data [team] For: variable: player]
Leather Armor in Color [variable: teamColor]
For Player/Entity [variable: player]
```

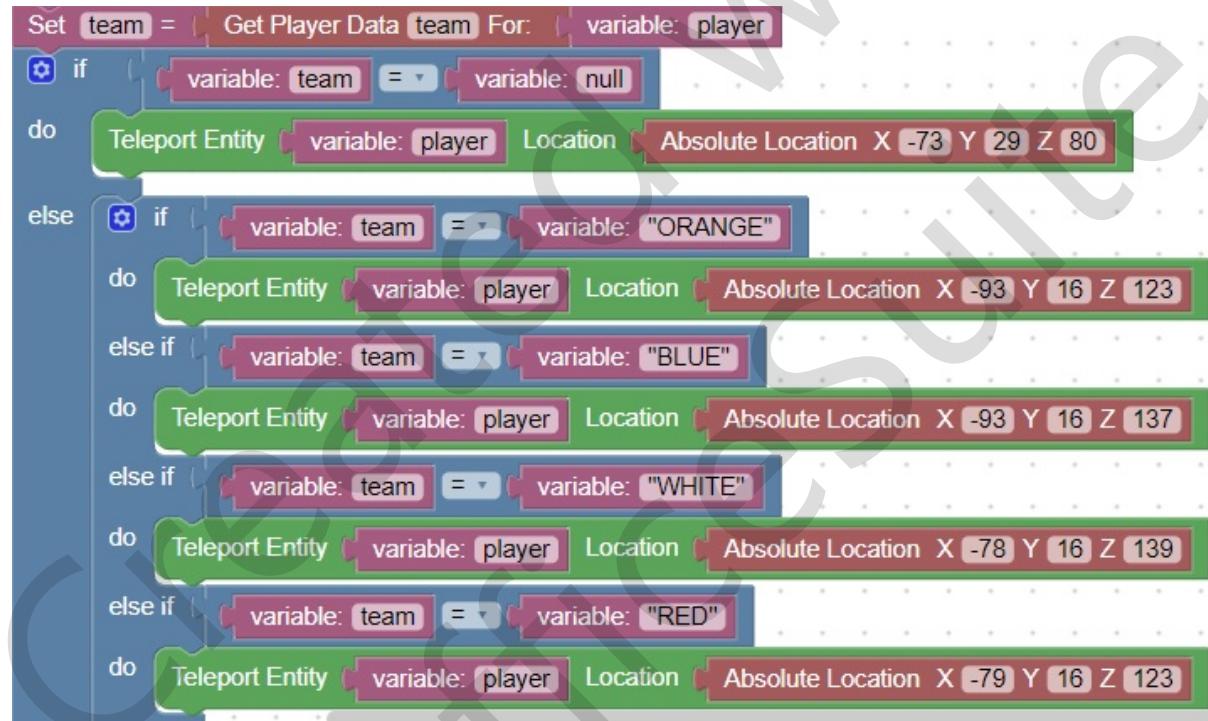
Cancel Friendly Damage

When a player damages a player on their same team, the event should be cancelled.



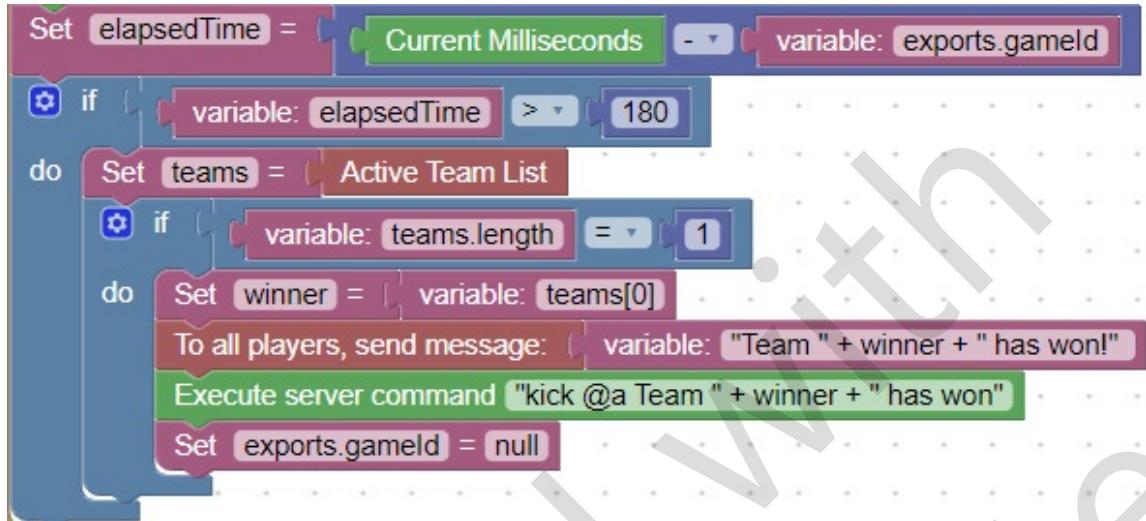
Set player location based on team

After a team is selected (by clicking on an oak sign), this code will teleport a player to their team spawn point



Detect Winner

When a player dies, count the number of active teams. When there is only 1 team left, that team has won.
Kick all players and send them a message congratulating the team that won
Also, reset gameId variable so the game will reset when the next player rejoins the server.



How to setup a public web-server

There are [many public minecraft servers available](#). Most are very similar.

It all comes down to cost versus playability

Here is the price chart for apexminecrafthosting.com:

The screenshot shows the Apex Hosting website's pricing section. It displays seven server options: 1 GB RAM, 2 GB RAM, 3 GB RAM, 4 GB RAM, 5 GB RAM, 6 GB RAM, and 7 GB RAM. Each option includes a description, price, recurring price, billing frequency, and an 'Order Now' button. A 'Proxy' option is also listed with a price of \$2.24 first month. The 4 GB RAM option is marked as 'popular'. The 5 GB RAM option is circled in red.

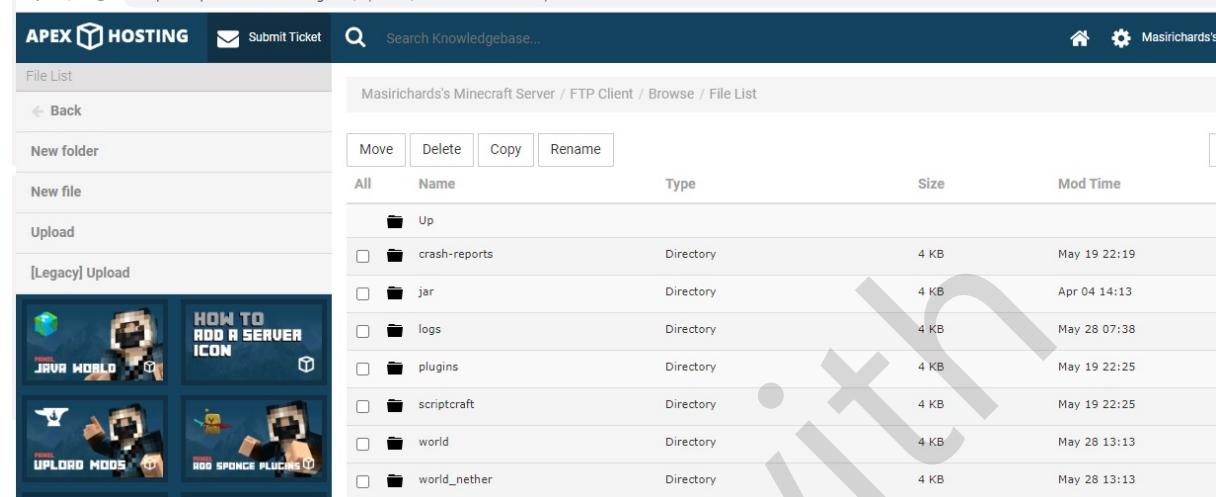
RAM	Description	First Month Price	Recurring Price	Billing Frequency
1 GB RAM	Basic servers	\$4.49 first month	\$5.99/mo	Billed Monthly
2 GB RAM	Basic servers & some modpacks	\$7.49 first month	\$9.99/mo	Billed Monthly
3 GB RAM	Basic servers & some modpacks	\$11.24 first month	\$14.99/mo	Billed Monthly
4 GB RAM	Basic servers & most modpacks	\$14.99 first month	\$19.99/mo	Billed Monthly
5 GB RAM	Basic servers & most modpacks	\$18.74 first month	\$24.99/mo	Billed Monthly
6 GB RAM	Basic servers & all modpacks	\$22.49 first month	\$29.99/mo	Billed Monthly
7 GB RAM	Basic servers & all modpacks	\$26.24 first month	\$34.99/mo	Billed Monthly
Proxy	512mb Only for Proxy	\$2.24 first month	\$2.99/mo	Billed Monthly

Servers use file transfer protocol (FTP) to move files from your personal computer to the web-site:

The screenshot shows the Apex Hosting server control panel for 'Masirichards's Minecraft Server'. On the left sidebar, there is a link labeled 'FTP File Access' which is circled in red. The main interface shows basic server status (ONLINE), server location (Vint Hill, Virginia - Request Transfer), and configuration settings like Name (Minecraft Server) and Player Slots (1337). There is also a 'Craft-List' integration section.

You need to copy scriptcraft.jar to the plugins directory, and copy over the files in your world directory

← → C panel.apexminecrafthosting.com/ftpClient/browse?id=319666&partial=

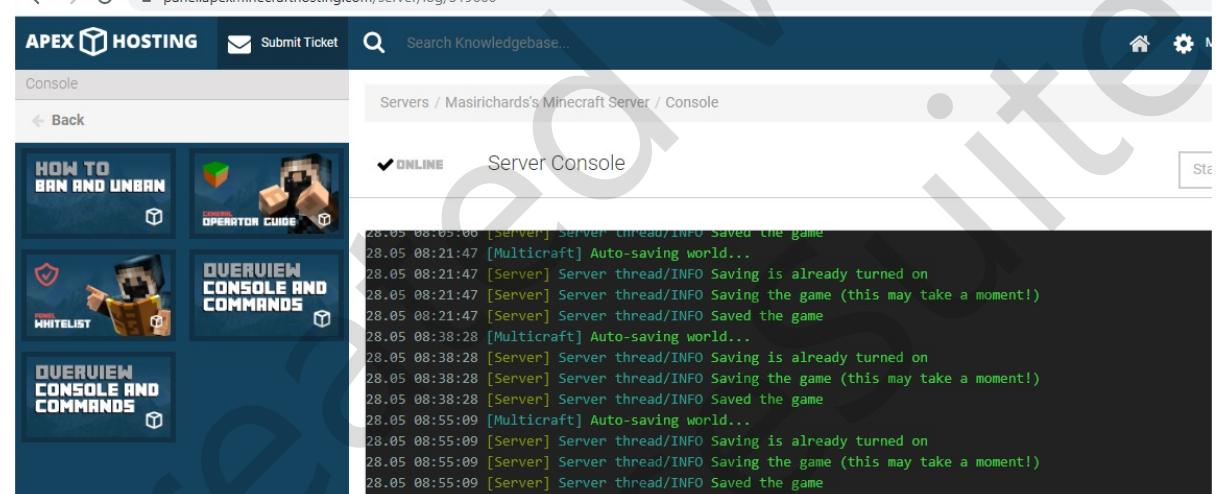


The screenshot shows a file browser interface. At the top, there are buttons for Move, Delete, Copy, and Rename. Below that is a table with columns for All, Name, Type, Size, and Mod Time. The table lists several directories: Up, crash-reports, jar, logs, plugins, scriptcraft, world, and world_nether. All these entries have a size of 4 KB and were modified on May 19, 2022, at 22:25.

All	Name	Type	Size	Mod Time
	Up			
<input type="checkbox"/>	crash-reports	Directory	4 KB	May 19 22:19
<input type="checkbox"/>	jar	Directory	4 KB	Apr 04 14:13
<input type="checkbox"/>	logs	Directory	4 KB	May 28 07:38
<input type="checkbox"/>	plugins	Directory	4 KB	May 19 22:25
<input type="checkbox"/>	scriptcraft	Directory	4 KB	May 19 22:25
<input type="checkbox"/>	world	Directory	4 KB	May 28 13:13
<input type="checkbox"/>	world_nether	Directory	4 KB	May 28 13:13

Then use the console to restart the server

← → C panel.apexminecrafthosting.com/server/log/319666



The screenshot shows a server console window. On the left, there are several links: HOW TO BAN AND UNBAN, OPERATOR GUIDE, OVERVIEW WHITELIST, and OVERVIEW CONSOLE AND COMMANDS. The main area is titled 'Server Console' and shows a log of server events. The log output is as follows:

```
28.05 08:05:00 [server] Server thread/INFO Saved the game
28.05 08:21:47 [Multicraft] Auto-saving world...
28.05 08:21:47 [Server] Server thread/INFO Saving is already turned on
28.05 08:21:47 [Server] Server thread/INFO Saving the game (this may take a moment!)
28.05 08:21:47 [Server] Server thread/INFO Saved the game
28.05 08:38:28 [Multicraft] Auto-saving world...
28.05 08:38:28 [Server] Server thread/INFO Saving is already turned on
28.05 08:38:28 [Server] Server thread/INFO Saving the game (this may take a moment!)
28.05 08:38:28 [Server] Server thread/INFO Saved the game
28.05 08:55:09 [Multicraft] Auto-saving world...
28.05 08:55:09 [Server] Server thread/INFO Saving is already turned on
28.05 08:55:09 [Server] Server thread/INFO Saving the game (this may take a moment!)
28.05 08:55:09 [Server] Server thread/INFO Saved the game
```

Project 2

Bedwars

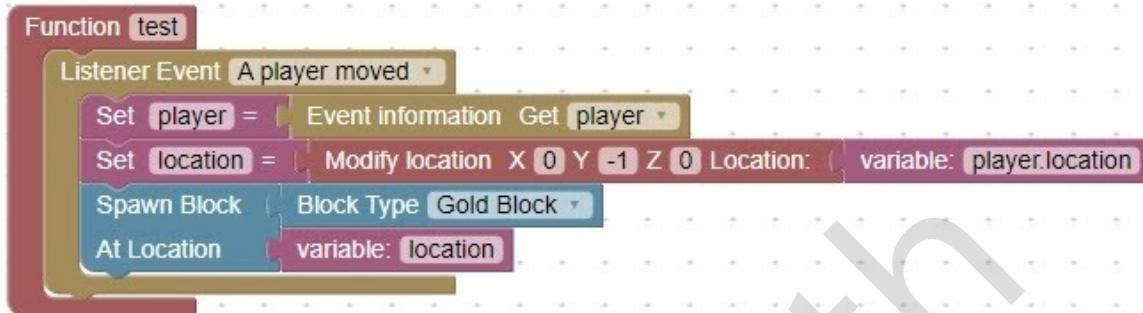
Special Rules

- When a player's team bed is destroyed they can no longer respawn
- Protect from friendly damage
- Only allow block destruction of beds and bed protection blocks
- Game is over when only 1 team remains

Created with
OfficeSuite

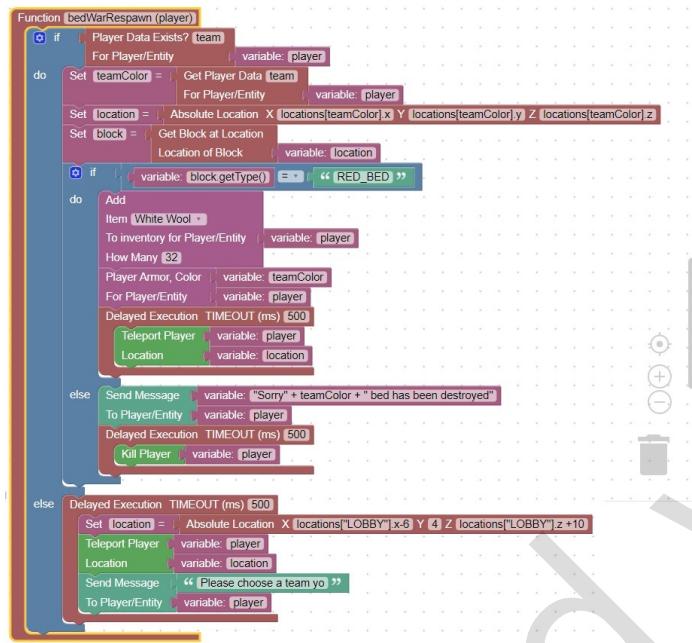
Scaffold

A scaffold allows a player to walk "on air", because as they move a solid block is placed under their feet.



Respawn

A player can only respawn if their bed still exists.

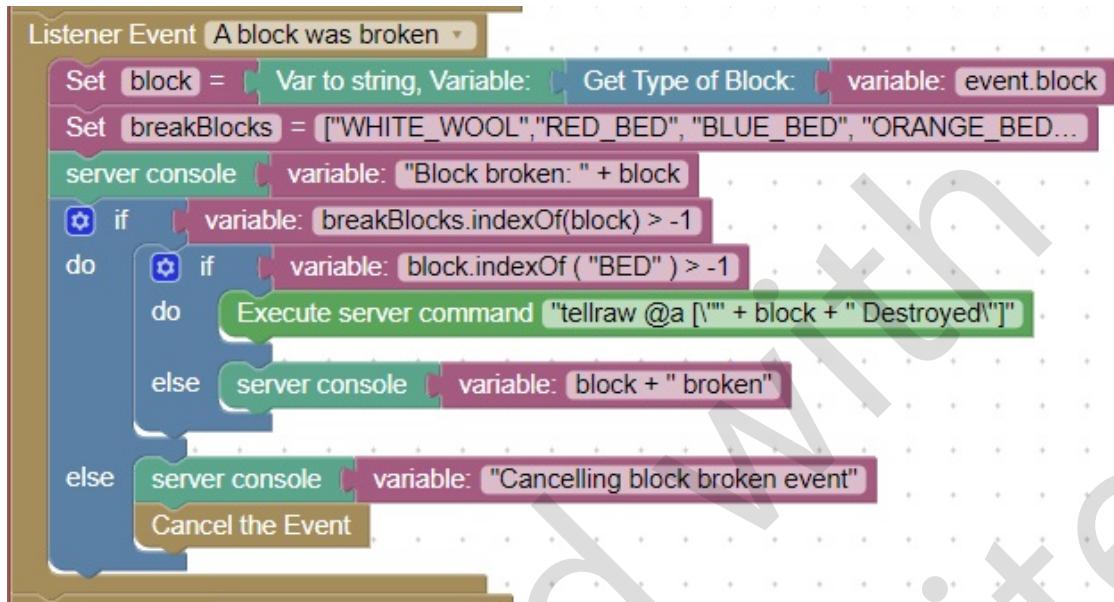


The image shows a Scratch script titled "bedWarRespawn". It starts with a function definition. Inside, there's an if-block checking if "Player Data Exist? team". If true, it sets "teamColor" to the player's team color and finds a location at "locations[teamColor] x" and "locations[teamColor] z". It then checks if the block at that location is a "RED_BED". If it is, it adds white wool to the player's inventory (32 items), gives them armor colored by "teamColor", and teleports them back to the lobby. If the block is not a bed, it sends a message to the player. If none of these conditions are met, it teleports the player to the lobby and sends a message to choose a team.

```
Function [bedWarRespawn : [player : ]]
If [Player Data Exist? team]
  Set [teamColor v] To [Get Player Data team]
  Set [location v] To [Absolute Location X [locations[teamColor] x] Y [locations[teamColor] y] Z [locations[teamColor] z]]
  Set [block v] To [Get Block at Location [Location of Block] variable [location]]
  If [variable [block getType ()] = RED_BED]
    Add [White Wool v] To Inventory for Player/Entity [player]
    How Many [32]
    Player Armor Color [teamColor v] For Player/Entity [player]
    Delayed Execution TIMEOUT (ms) [500]
    Teleport Player [player] To Location [location]
  Else
    Send Message [Sorry + teamColor + bed has been destroyed!] To Player/Entity [player]
    Delayed Execution TIMEOUT (ms) [500]
    Kill Player [player]
  Else
    Delayed Execution TIMEOUT (ms) [500]
    Set [location v] To [Absolute Location X [locations["LOBBY"] x-6] Y [4] Z [locations["LOBBY"] z+10]]
    Teleport Player [player] To Location [location]
    Send Message [Please choose a team yo!] To Player/Entity [player]
```

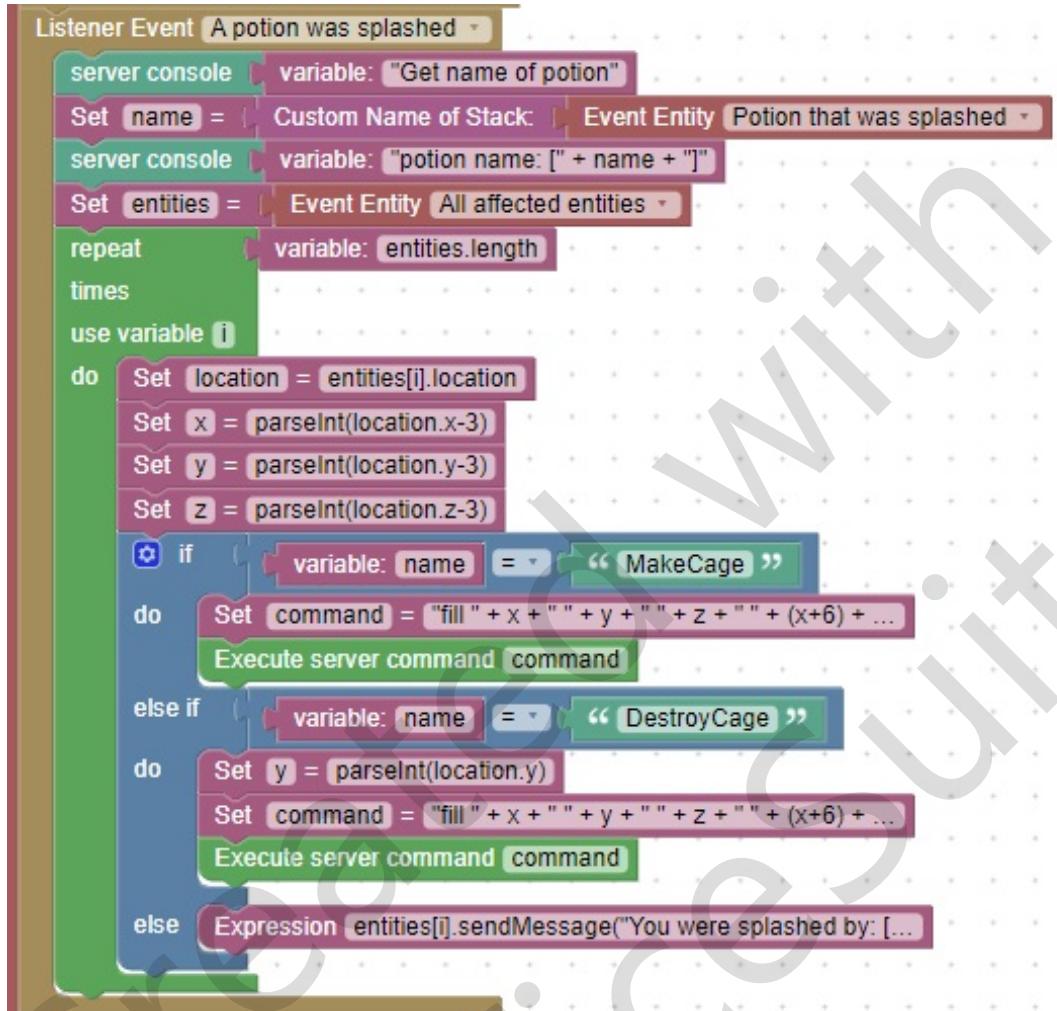
Bed Destruction

Notify all players when a bed is destroyed



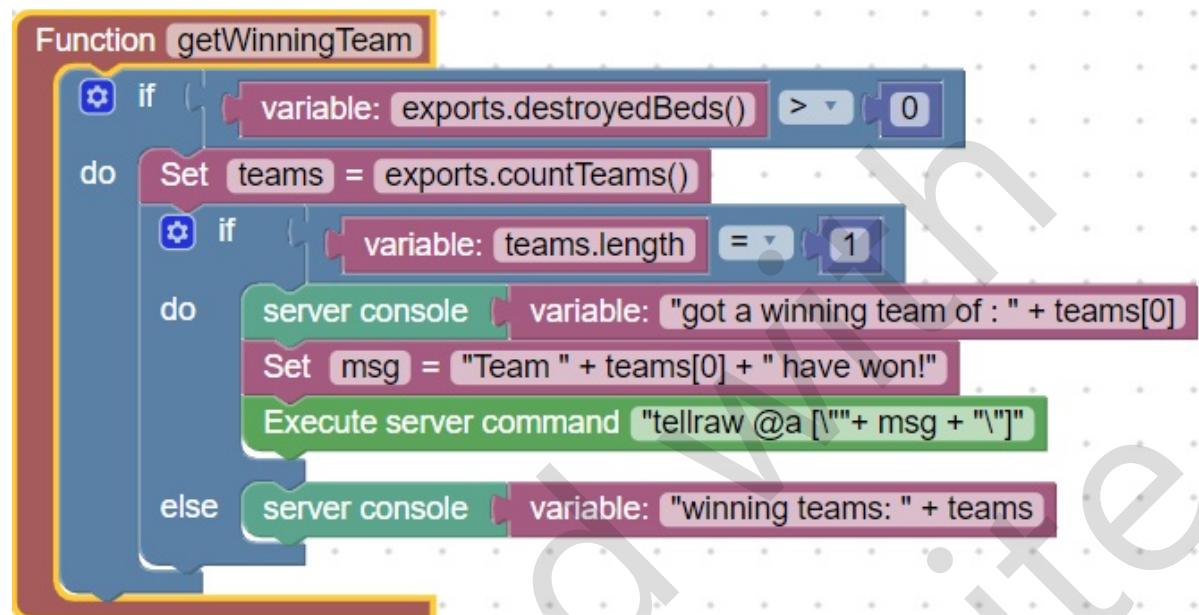
Splash Potion

A splash potion can create a special effect:



Game Over Detection

The game is over when only 1 team remains:



Project 3

Omaha Beach MiniGame

Highlights

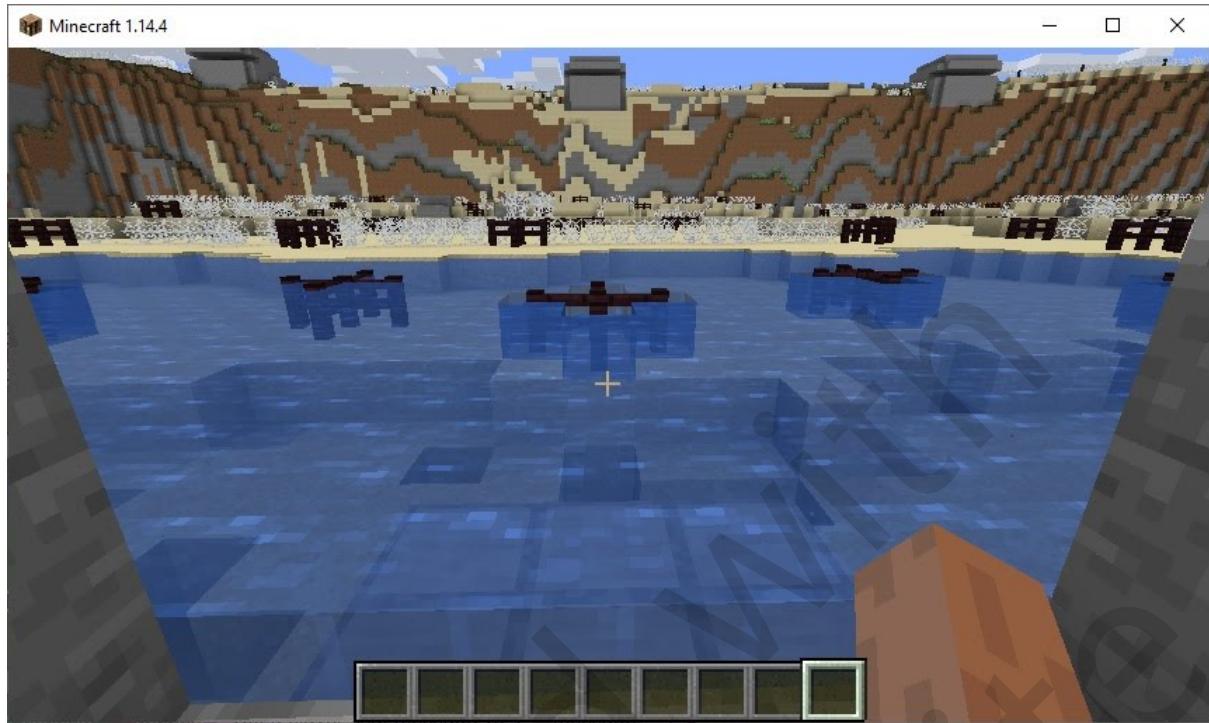
- Special Weapons: Sniper arrows, Minigun
- Special Player Types: King, Soldier
- Protect player gear inventory after respawn

Omaha Beach overview

This is a battle-royal with a king attacker, king defender, and king airforce (attacker). Like bed-wars you cannot respawn if your king is destroyed. Attackers, defenders, artillery and airforce soldiers will become spectators when they respawn and their king is dead.



View from attackers:



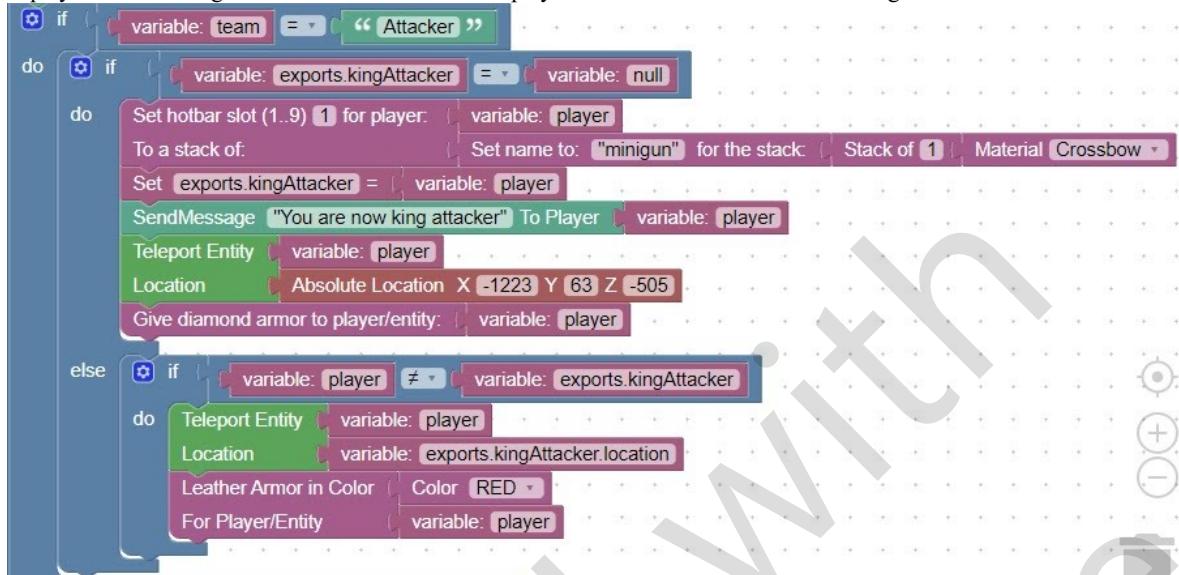
Special Weapon: Sniper Arrow

A sniper arrow travels faster and does more damage than a normal arrow



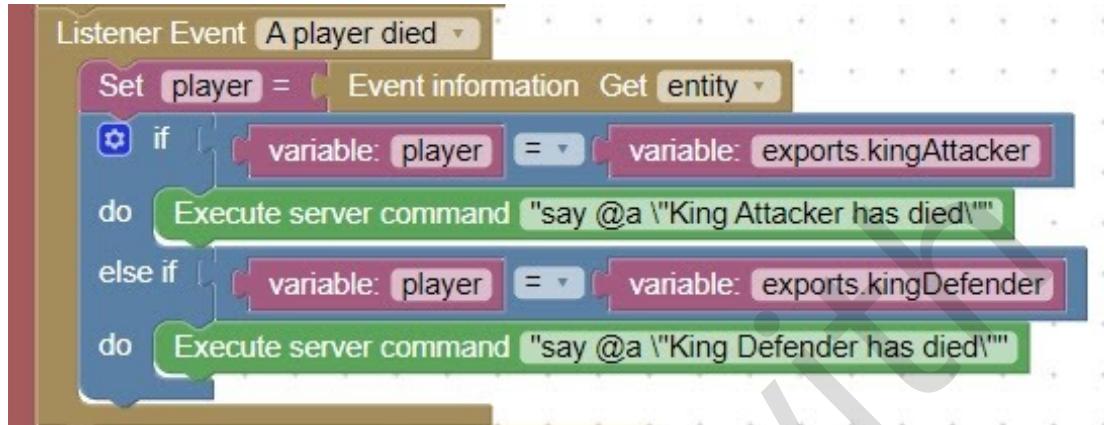
Player Type

A player can be a king or a normal soldier. The first player to select a team becomes the king:



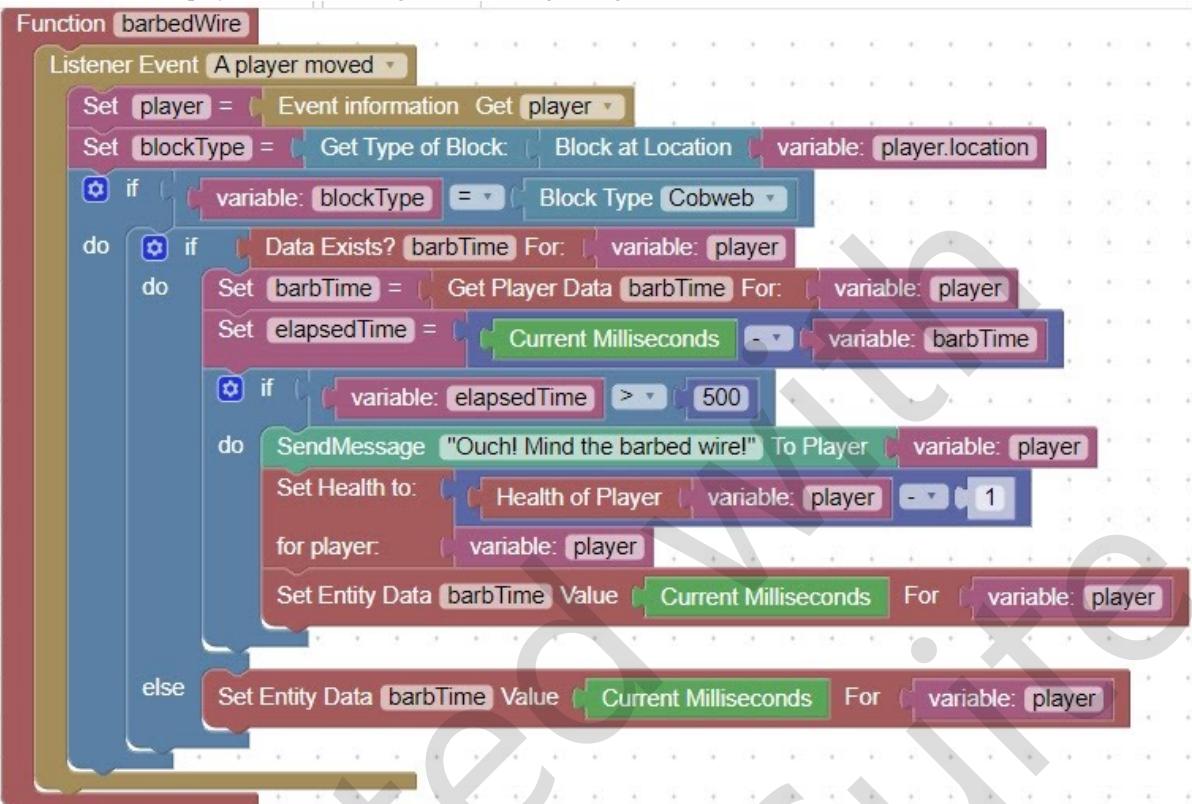
King Death Notification

A special message is sent to all players when a king dies:



Cobweb Damage

Like barbed wire, a player will take damage when moving through a cobweb

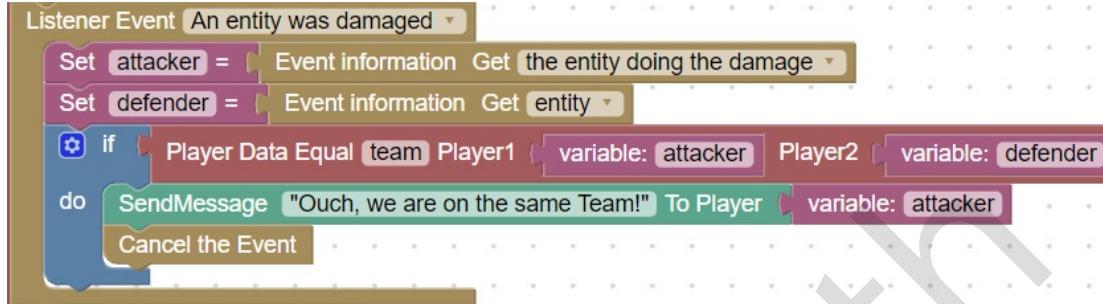


The image shows a Scratch script titled "Function barbedWire". It starts with a "Listener Event A player moved" hat block. Inside, it sets "player" to "Event information Get player". Then, it sets "blockType" to "Get Type of Block Block at Location variable: player.location". An "if" condition checks if "blockType" equals "Cobweb". If true, it enters a "do" loop. Inside the loop, it checks if "Data Exists? barbTime For: variable: player". If true, it sets "barbTime" to "Get Player Data barbTime For: variable: player". It then sets "elapsedTime" to "Current Milliseconds variable: barbTime". Another "if" condition checks if "elapsedTime" is greater than 500. If true, it sends a message "Ouch! Mind the barbed wire!" to the player, sets the player's health to 1, and updates the entity data "barbTime Value Current Milliseconds For variable: player". Finally, it exits the "do" loop with an "else" branch that sets the entity data "barbTime Value Current Milliseconds For variable: player".

```
function [barbedWire : ]()
    when [A player moved]
        set [player v] to [Event information Get player]
        set [blockType v] to [Get Type of Block Block at Location variable: player.location]
        if (blockType = Cobweb) then
            do
                if (Data Exists? [barbTime v] For: [player v]) then
                    set [barbTime v] to [Get Player Data barbTime For: [player v] variable: player]
                    set [elapsedTime v] to [Current Milliseconds v] variable: barbTime
                    if (elapsedTime > 500) then
                        send [Ouch! Mind the barbed wire!] (to [player v])
                        set [Health to 1] (of [player v])
                        Set Entity Data [barbTime v] Value [Current Milliseconds v] For [variable: player]
                    end
                end
            end
        else
            Set Entity Data [barbTime v] Value [Current Milliseconds v] For [variable: player]
        end
    end
end
```

Cancel Friendly Damage

When a player damages a player on their same team, the event should be cancelled.



Keep Inventory

Server commands can be used to clear and keep inventory:

Execute server command "clear @a"

Execute server command "gamerule keepInventory true"