

Minecraft + MS Makecode / Tynker



Andrea Sterbini – sterbini@di.uniroma1.it

Minecraft for Education

Available to all Sapienza students

Download it from MS Store

Use your official email/password to authenticate

Programmable with 3 systems:

- MS Makecode (Blocks/Typescript)
- Tynker
- Python!

Minecraft programming with MS Makecode

<http://minecraft.makecode.com>

Define new Events associated to:

- the player:

- hearing someone saying something
- chat commands (with number args)

- actions

(walk, swim water/lava, fall, climb
fly, ride, sneak, sprint, bounce)

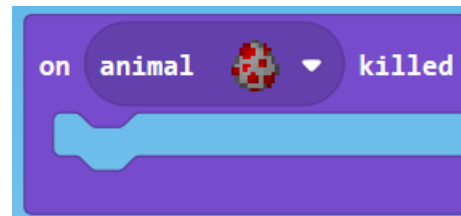
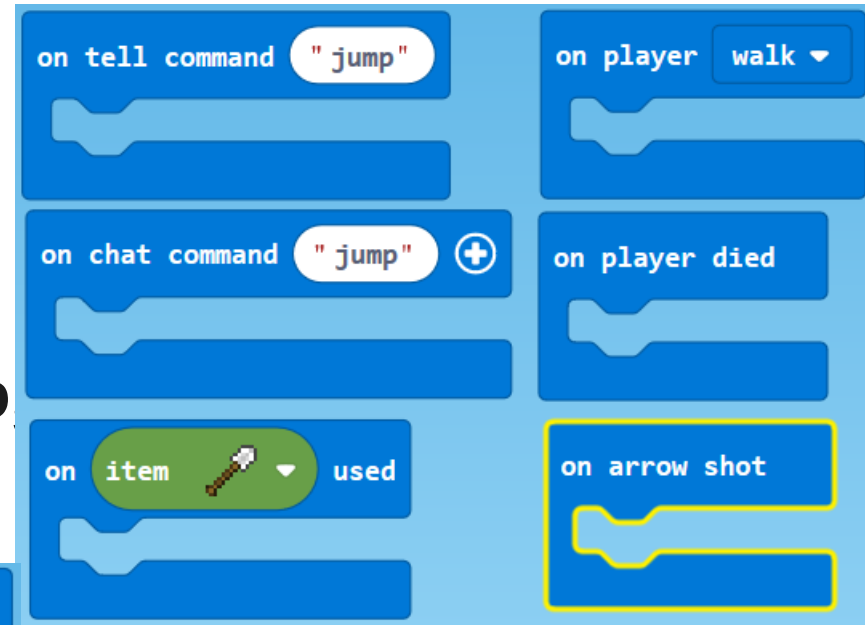
- using tools/arrows

- dying/teleporting

- blocks placed/broken

- animals killed

many more



Control blocks

External blocks:

- Forever (MANY allowed)
- OnStart (only one allowed)
- RunInBackground NEW!!! (only one allowed)

Loops: repeat N times, counted loop, foreach, while-do

Function definition:

- WITH parameters NEW!!! (text, number, bool, position)
- WITH return

Typescript: a statically typed JavaScript mode

Programming style

Event-based programming

ONE foreground thread

(onStart)

ONE background thread

(but MANY forever loops !?!)

Functional?

(only in JavaScript/Python)

Object-oriented?

(only in JavaScript/Python)

Threads? NO

Messages? ONLY TO PLAYERS (Say XXX to player YYY)

Minecraft-specific elements

Player:	position and chat commands
Player's Agent:	move/teleport/destroy/collect/carry
Other Entities:	teleport/enchant/give/apply effect/execute command
Blocks:	fill/clone block in layer/volume, test for block
Mobs:	spawn/kill animals
Gameplay: set	weather/difficulty/time/game rules survival/creative/adventure
Builders:	for building big structures
Reporters for:	positions, nearest entities, named players, ...
Shapes:	lines/circles/spheres of blocks

Hour of Code



Hour of Code 2019 (AI)

By Minecraft: Education Edition



Hour of Code 2020 (Inclusion)

By Minecraft: Education Edition



Minecraft Code Town

By Minecraft: Education Edition

Firefighter scenario (AI)

Town full of puzzles to solve

Interaction between two villages (Inclusion)

Very simple coding tasks with a limited number of blocks available

More Examples



MONTHLY BUILD CHALLENGES



BIOMES



WORLDS



HOW TO PLAY

Meth



DIGITAL CITIZENS

Y AND
SION

necraft/Tynker

Minecraft programming with Tynker

<http://tynker.com>

Events: onStart

when XXX/Any Block Placed/Broken

when XXX/Any Item Acquired/Dropped/Used

when XXX/Any Received Chat Message/Tell

when Player Travels/Dies/Teleported/Bounced

when XXX Mob Killed/Spawned

Agent move/turn/place/detect/attack/destroy
collect/till/drop/teleport

TynkerBot test
start/run/clear buffer
move/turn/point to/checkpoint

Programming style

NO JavaScript edit (but you can view it read-only)

Event-based programming

Sending/receiving/waiting messages (with parameter)

Functions WITH args and WITH return statement
(they can be used both as block or as reporters if needed)

BEWARE! name changes are NOT updated everywhere!!!

Other actors

World:

- give XXX/kill/enchant player/entity
- weather ...

Agent: (visible agent)

TynkerBot: (invisible agent) **NEW!**

Block Language properties

Types: numbers, strings, lists, items, mobs, blocks

Messages with values (and wait)

Loops with BREAK and CONTINUE

Functions with arguments and return

Local variables (to function, actor or global) with initializer

Object properties, “keys of” → dictionary?

NO print/say/drawtext ?

Minecraft programming

PROS

and

CONS

Good for Adventures/
Exploration-based games

Appealing to Minecraft fans

Appealing to BUILDERS

So many events and options!!!

A lot of work to build the scenery

Hard on 3D-sick people

A lot of work to just to FIND stuff
(an easy guide is needed)

Demo

<http://minecraft.makecode.com>

DEMO

<http://tynker.com>