

NPC Script

Created by Wohstand, May 4 2014

This is a declarative script language, using for programming algorithms of NPCs. The main language units are the states and events.

The NPC programm have two type: *parametric*, *algorithmic*.

The *Parametric* type using the basic parameters from config files and usign the default simple-moving alhorithm.

The *Algorithmic* type using the declared events and states in special file. This allows to NPC using itself working schemes.

Contents

- System states
- Physical states
- System events
- Commands
 - Definitions
 - Parametric
 - Events and states
 - All of NPC's
 - Graphics and Animations
 - Effects
 - Modify player's state
 - Detectors
 - Conditional expressions
- NPC's Options

System states

The states, applying by engine

_DEFAULT	Startup NPCs STATE
-----------------	--------------------

Physical states

The states, applying automatically by physical environment, where currently placed NPC

_GROUND	NPC stay on ground
_AIR	NPC flying/falling in air
_UNDERWATER	NPC under water
_LAVA	NPC stay on block, marked "as lava"

System events

The events, what calling on game process events by engine

_ACTIVATE	NPC appeared on screen
_DEACTIVATE	NPC Deactivating, if it be offscreen 4 sec ago
_KILL_JUMP	Player jump to his head in flying state
_KILL_SLIDE_SLOPE	Player collided with NPC while he sliding on slope
_KILL_BY_NPC	Collided with NPC, what have option "HURT_NPC=TRUE"
_KILL_FIREBALL	Collided with NPC, marked as "fireball"
_KILL_ICEBALL	Collided with NPC, marked as "iceball"
_KILL_HAMMER	Collided with NPC, marked as "palyer's hammer"
_KILL_BOMB	Collided with bomb explosion zone (and Peach's bomb)
_KILL_BOOMERANG	Collided with NPC, marked as "boomerang"
_KILL_TAIL	Collided with player's sprite zone, placed in player's front, and have height=(player/2)
_KILL_SPIN	Player jump to his head in state "Spining"
_KILL_BY_SHOE	Player jump to his head with mounded items (Shoes, Yoshis, helicopter)
_WAS_EATEN	NPC was eaten by Yoshi
_ON_LAVA_COLLISION	NPC was contacted with block, marked as "lava"
_ON_CLIFF	He collided with cliff
_ON_DIE	He died
_ON_PLAYER_COLLISION	He collided with player
_ON_BLOCK_COLLISION	he collided with block
_ON_NPC_COLLISION	he collided with NPC
_ON_ANY_COLLISION	he collided with any objects
_ON_THROW	He did be thowed by player or by generator
_ON_PUT	He did be puted by player or by generator
_ON_TAKE	NPC did taked by player
_PHYSICAL_STATE_CHANGED	If was changed the physical changed: example, NPC falled to water from air

Language commands:

Definators:

the user's comments in script
`//comment`

define state with name XXXX

STATE XXXX:
 <commands>

define event with name YYYY

EVENT YYYY:
 <commands>

Parametric:

set NPC's health as XX - default 1

SET_HEALTH XX

set acceleration value to ZZ, if value 0 - speed changing instance

SET_ACCELERATION ZZ

set speed in pixels per second

SET_SPEED ZZ

change playing music by ID=YY

CHANGE_MUSIC YY

Play sound with ID=YY

PLAY_SOUND YY

Events and states:

NPC's state to state with name ZZZZ

CHANGE_STATE ZZZZ

Call to defined event with name XXXX

_CALL XXXX

All of NPC's:

Subtract the number with value=YY from NPCs health. If health <=0 - NPC was died

APPLY_DAMAGE YY

Transform NPC to NPC with ID value=YY

TRANSFORM_TO_NPC YY

Transform to NPC-container with ID=YY and put this NPC into him

PACKINTO_NPC YY

Kill packed NPC:

DESTROY_PACKED

Spawn other NPC with ID=YY

SPAWN YY

SPAWN YY TYPE DIRECTION SPEED

Spawn NPC with ID=YY, with TYPE (PROJECTIVE, PUT),
direction (UP DOWN LEFT RIGTH TOPLAYER[350 25] 45)
with speed with value=SPEED

directions:

UP DOWN LEFT RIGTH FRONT REAR	static direction
TOPLAYER	ind player's center position and calculate direction
TOPBOTTOM	find player's bottom position and calculate direction
TOPLAYER[350 25]	find player's position and calculate direction params - corner gradus limits
45	static gradus direction, relative to NPC's h-front
RAND	Random without gradus limits
RAND[350 25]	set random direction in slected gradus range

start NPCs movement with speed fade (need to declare acceleration)

DO_RUN

Stop with speed fade (need to declare acceleration)

DO_STOP

Force deactivate NPC and return it on his start position

DO_DEACTIVATE

Jump UP NPC with vertical INERTIA SPEED

JUMP YY

Kill this NPC:

DIE

Define animations and graphics:

set static frame number XX (0-n frames on animated sprite)

SET_C_FRAME XX

set animation with framelist (example [1 2 3 4 5]) with loop.

SET_ANIMATION [framelist] ANITYPE

Where ANITYPE - is NPCs physical state:

GROUND, AIR, UNDERWATER or ANY

show non-loop animation with frame-delay value=YYY and set as static the last frame in defined framelist

SET_F_FRAME [framelist] YYY

set animation frame delay in milliseconds

SET_FRAMESPEED ZZ

Effects:

Start effect animation on NPCs position (dynamic effects will use his default settings)

DO_EFFECT YY

Start dynamic effect with defined properties

DY_EFFECT YY POSITION DIR SPEED

position:

CENTER, POS[12 44] (relative at NPC's current position)

direction:

LEFT RIGHT UP DOWN FRONT REAR	static directions
TO_PLAYER	find player's center position and calculate direction
TO_PBOTTOM	find player's bottom position and calculate direction
TO_PLAYER[350 25]	find player's position and calculate direction params - corner gradus limits
45	static gradus direction, relative to NPC's h-front
RAND	Random without gradus limits
RAND[350 25]	set random direction in slected gradus range

You can use **TO_PLAYER, FRONT** or **TOPBOTTOM, FRONT** for spawn effect on NPC's FRONT if collosion with player has not detected

Speed movement:

Dynamic effect speed declaring in pixels per second

Modify player state: (Will be modified only with player, what collided with NPC)

Change Mounted objects on player:

SET_MOUNTED XX YY

XX – Mount type (0 – nothing, 1 – show, 2 – helicopter, 3 – horse/dinosaur)

YY – mounted object ID:

Shoes: 1-3

helicopters: 1-2

horses: 1-8

Change player's power-up state:

SET_PLAYER_STATE XX

XX – Player's state number: 1-7:

1 – small, 2 – big, 3 – fire, 4 – raccoon, 5 – tanooki, 6 – hammer, 7 - ice

Detectors

Detectors allow to call events on object detection

Set detector on current state (if current state was changed, detector will be disabled):

SET_DETECTOR OBJECT DISTANCE XX DIRECT EVENT

Object:

BLOCK	Detect block
BLOCKID YY	Detect block with ID value=YY
PLAYER	Detect playable characyer
NPC	Detect any NPC
NPCID YY	Detect NPC with ID value=YY
BGO	Detect any BGO
BGOID YY	Detect BGO with ID value=YY

Detection type:

DISTANCE	detect object on approximations by distance radius (square) value=XX
DISTANCE_H	detect object on horisontal approximations by distance value=XX
DISTANCE_V	detect object on vertical approximations by distance value=XX
COLLISION	detect object on collision with them

Detector directions:

ANY	Allow detect in all directions
TOP, BOTTOM, FRONT, BACK, TOP_FRONT, TOP_BACK, BOTTOM_FRONT, BOTTOM_BACK	Use direction limit for object detection

EVENT

- call global or user defined event if detector was passed

Conditional expressions:

Single:

```
IF [ expression ]  
[  
<commands>  
]
```

Double: True/False actions:

```
IF [ expression ]  
[  
<commands>  
]  
ELSE  
[  
<commands>  
]
```

Expressions:

Single:

```
[ VALUE op VALUE ]
```

Multi:

```
[ [ VALUE1 = VALUE2 ] && [ VALUE1 != VALUE3 ] ]
```

Operators:

```
=      >      <      >=     <=     !=
```

Logical (if you checking many expressions):

```
&&     ||
```

Timer:

The timer will run your commands after his timeout
set timer on YYY milliseconds

```
SET_TIMER YYY  
[  
<commands>  
]
```

Looped timer with YYY delay

```
SET_TIMER_LOOP YYY  
[  
<commands>  
]
```

Timer will reset, if state with defined timer, changed

NPCs Options:

change system NPCs options

SET_OPT OPTION YYY

Get current option value:

OPT_OPTION

Options table:

<i>Option</i>	<i>Values</i>	<i>Description</i>
HURT_PLAYER	TRUE/FALSE	NPC will hurt the player
HURT_NPC	TRUE/FALSE	NPC will hurt the other NPC
EATABLE	TRUE/FALSE	NPC can be eaten by Yoshi
SLIDE_SLOPE	TRUE/FALSE	NPC can be kicked on slope slide
JUMPED	TRUE/FALSE	NPC can be kicked on head-jump
DEACTIVATION	TRUE/FALSE	NPC will deactivate on off-screen 4 sec ago
KICKEDBYNPC	TRUE/FALSE	NPC can be kicked by other NPC
FIREBALL	TRUE/FALSE	NPC can be kicked on fire ball
ICEBALL	TRUE/FALSE	NPC can be freeze on ice ball
HAMMER	TRUE/FALSE	NPC can be kicked on hammer
ALLOW_TAIL	TRUE/FALSE	NPC can be kicked by tail
ALLOW_SPIN	TRUE/FALSE	NPC can be kicked on spin
ALLOW_SHOE	TRUE/FALSE	NPC can be kicked on mounted objects
CLIFF_DETECT	TRUE/FALSE	NPC will detect cliffs on movements
EFFECT	UNSIGNED INTEGER	Default “die” effect ID
SH_EFFECT	UNSIGNED INTEGER	Default “kicked” effect ID
SCORE	0-12	Give Score to player on kick NPC
GRAVITY	TRUE/FALSE	Enable/disable gravity
GRAB_SIDE	TRUE/FALSE	NPC can be grabbed on side
GRAB_TOP	TRUE/FALSE	NPC can be grabbed on top
GRAB_ANY	TRUE/FALSE	NPC can be grabbed on any collisions
TAKABLE	TRUE/FALSE	NPC can be takes by player
LAVA_PROT	TRUE/FALSE	NPC will not burn in lava
ADHESION	TRUE/FALSE	Allows to NPC walking on walls and on ceiling
D_HEALTH	UNSIGNED INTEGER	Default NPC's health
SPECIAL	INTEGER	Special option
CONTAINER	TRUE/FALSE	This NPC is – container. Special value is a containing NPC