Turtle Field Quick Reference

11-JUN-2017, Y. Hayakawa (CITE, Tohoku Univ.)

Ruby methods in Turtle class

connect to server: Turtle.new(hostname) — use TCP port 2222

Turtle Graphics

clear screen	clr
home position	home — origin is the center of square
pen up	pu
pen down	pd
step forward	fd(step)
step back	bk(step)
jump	jump(x, y) — unit of length: pixel
relative jump	rjump(dx, dy)
turn left	lt(angle)
turn right	rt(angle) — unit of angle: degree
print string	say(string)
line mode	line
brush mode	brush
filling mode	fill — max # of vertices in filling mode: 6
display card	card(type,x,y) — type: 1..53
clear card	clrcard
query curr. position	q_pos — returns [x, y]
query heading direction	q_dir — returns angle
pen color	col(red, green, blue) — 0.0 < red green, blue < 1.0
background color	bgc(red, green, blue)

Methods to be called on events

hit_by_bullet(time)

run_into_turtle(time)

run_into_donut(time)

run_into_stone(time)

run_into_wall(time)

found_coin(time)

detected_by_finder(time)

detected_by_radar(time)

got_message(time)

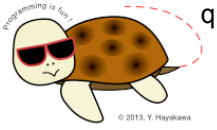
time code is passed

Regulations/limitations in battle (robot) mode

step size of FD & BK: up to 2 pixels
turning angle: up to 3 degrees
field is surrounded by rigid walls
only single bullet can exist at a moment in the field for each turtle

Battles & robot simulations

	methods
switch to battle mode	bmode
switch to graphics mode	gmode
shoot a bullet	fire
set nickname	nm(name)
set my team number	tm(team_id) — 0<=team_id<=4
query number of objects	q_nt — # of turtles and donuts
query to finder	q_finder — returns code
set range of finder	rf(range)
query to angular radar	q_radar — returns angle
query to sonar	q_sonar — returns [left, front, right]
query my current score	q_score — returns current score
query team id of turtle met just before	q_tm — returns the id (use this after Q_FINDER or Q_RADAR calls)
put a robot turtle in the field	robot
scatter a donut in the field	donut — max 10 donuts for each
scatter a coin in the field	coin
borrow 10 coins from the TF owner	borrowcoin — max 300 coins in the field
drop a coin at current position	dropcoin
pick one coin near current position	pickcoin — returns the number
check number of coin at near distance	q_coin
broadcast message to team members	bcas(message)
query team message	q_bcas — returns the message



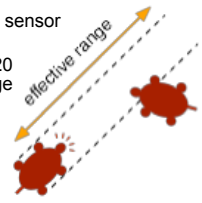
C, Java, and Python APIs are available at TurtleField web site:
http://seaotter.cite.tohoku.ac.jp/coda/tfield/index.html

Scoring

initial score of each: 100
point to loose for each shoot: -1
hitting other turtle: +10
hit by bullet:-30
hitting donut within short distance: +10
when score < 0, disconnected

FINDER front sensor

default: 20
use rf() to change



result code = 0: no objects within effective range
1: turtle 2: donut 3: stone 4: wall found

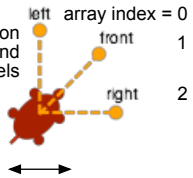
RADAR angular sensor

angle to the nearest object (turtle or donut)

measurement error: ±20 deg

SONAR obstacle detector

for each direction
false: no obstacle, true: obstacle found
within 20 pixels



size of turtle: 20 pixels in diameter

Usage of Turtle Field server

right click on screen to pop up menu

press capital **M**: enter maze mode
3: toggle b/w 2D and 3D modes

http port for Turtle Field Live: 2280

clear field	clear drawing
erase zombie	erase turtles that lost TCP connections
toggle graphics/battle mode	in battle mode, background texture changes
toggle private/public mode	in public mode connections from any addr. are accepted. window title bar changes
capture screen	save screen shot in home (UNIX) or desktop (Windows)
kill all turtles	
exit	