Concurrent programming lab02 - simon.barras

!!!WARNING!!! - C7: Long lines detected

babybird.py:178:0: C0301: Line too long (126/120) (line-too-long)

↳ too bad .... in the comments

5.5

```python
 1: #!/usr/bin/env python3
 2: # -*- coding: utf-8 -*-
 3:
 4: # Copyright 2020, School of Engineering and Architecture of Fribourg
 5: #
 6: # Licensed under the Apache License, Version 2.0 (the "License");
 7: # you may not use this file except in compliance with the License.
 8: # You may obtain a copy of the License at
 9: #
10: #    http://www.apache.org/licenses/LICENSE-2.0
11: #
12: # Unless required by applicable law or agreed to in writing, software
13: # distributed under the License is distributed on an "AS IS" BASIS,
14: # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
15: # See the License for the specific language governing permissions and
16: # limitations under the License.
17:
18:
19: """
20: Simulate a bird's nest with threads and semaphores
21: """
22:
23: __author__ = "Simon Barras"
24: __date__ = "2021-11-12"
25: __version__ = "0.1.0"
26: __email__ = "simon.barras@edu.hefr.ch"
27: __userid__ = "simon.barras"
28:
29: import threading     # Thread and semaphore
30: import random        # Random number generator
31: import logging       # Print log in console with information of the thread
32: import sys           # Usefull for paramters
33: import names         # library for adding random names
34:
35: # Constants
36: WAIT_BIRD = 10       # Maximum wait time for a bird
37: WAIT_MAX = 50        # Maximum wait time for a an method
38: NB_OF_PARENTS = 2
39: MAX_ARGS = 4
40: SUCCESS_RATE_INDEX = 3
41: # Default values
42: DEFAULT_NB_CHICKS = 17
43: DEFAULT_BABY_ITR = 53
44: DEFAULT_FOOD_CAPACITY = 7
45: DEFAULT_HUNTING_RATE = 50
46:
47: # Global variables
48: g_nb_day_to_be_a_chicken: int
49: g_chicks = []
50: g_parents = []
51: g_nb_of_worm = 0
52: g_food_capacity: int
53: g_hunting_success_rate: int
54:
55: # Semaphores
56: sem_wait_eat = threading.Semaphore(0)
57: lock_worm_tank = threading.Semaphore(1)
58: lock_tank_fill = threading.Semaphore(1)
59:
60:
61: class Chick():
62:     """
63:     Object for simulating a baby bird.
64:     Use a thread and routine to live.
65:     """
66:     name: str
67:     spirit: threading.Thread
68:     speed: float
69:     live: threading.Semaphore
70:
71:     def __init__(self):
72:         self.spirit = threading.Thread(target=self.live)
73:         self.speed = random.randrange(WAIT_BIRD)
74:
75:     # Start the thread and the routine
76:     def born(self, name: str = ""):
77:         self.name = "Chick " + name
78:         self.live = threading.Semaphore(0)
79:         self.spirit.start()
80:
81:     # Routine of the bird's life
82:     def live(self):
83:         for _ in range(g_nb_day_to_be_a_chicken):
84:             self.sleep()
85:             self.get_food()
86:             self.eat()
87:             self.digest_and___()
88:
89:         self.leave_the_nest()
90:
91:     # Wait a random time
92:     def sleep(self):
93:         logging.debug("%s is sleeping", self.name)
94:         nap(self.speed)
95:
96:     # Take food only if the tank isn't empty and nobody is using the variable "g_nb_of_worm"
```

{C3: describe them } (handwritten annotation pointing to lines 48–58)

{ also here, ... describe } (handwritten annotation pointing to lines 66–69)

```
 97:        def get_food(self):
 98:            logging.debug("%s is filling his plate", self.name)
 99:            global g_nb_of_worm
100:            sem_wait_eat.acquire()
101:            with lock_worm_tank:
102:                g_nb_of_worm -= 1
103:                if g_nb_of_worm == 0:          # . ~
104:                    lock_tank_fill.release()   # .. ~
105:
106:        # Random timer
107:        def eat(self):
108:            logging.debug("%s is eating", self.name)
109:            nap(self.speed)
110:
111:        # Random timer
112:        def digest_and___(self):
113:            logging.debug("%s is digesting", self.name)
114:            nap(self.speed)
115:
116:        # last method of the life cycle
117:        # Release the semaphore
118:        def leave_the_nest(self):
119:            logging.debug("%s is ready to take the plunge", self.name)
120:            self.live.release()
121:
122:        # Call by main thread for waiting until the bird left the nest
123:        def farewell_party(self):
124:            self.live.acquire()
125:
126:        # Close the thread
127:        def funeral(self):
128:            self.spirit.join()
129:            logging.debug("%s is buried", self.name)
130:
131:
132: class Parent():
133:     """
134:     Object for simulating a parent bird.
135:     Use a thread and routine to live.
136:     """
137:     name: str
138:     spirit: threading.Thread
139:     speed: float
140:     has_child: bool
141:     hunting_result: int
142:
143:     def __init__(self):
144:         self.spirit = threading.Thread(target=self.live)
145:         self.speed = random.randrange(WAIT_BIRD)
146:         self.has_child = False
147:
148:     # Start the thread and the routine
149:     def born(self, name: str = ""):
150:         self.name = "Parent " + name
151:         self.hunting_result = 0
152:         self.has_child = True
153:         self.spirit.start()
154:
155:     # Routine of the bird's life
156:     def live(self):
157:         while(self.has_child):
158:             self.hunt()
159:             self.deposit_food()
160:             self.rest()
161:
162:     # Wait a random time and then try to hunt.
163:     # The probability for the parent to find something is define ine the parameters.
164:     # The number of food find is a random number: 0 < food <= food capacity.
165:     def hunt(self):
166:         logging.debug("%s is hunting", self.name)
167:         nap(self.speed)
168:         if random.randrange(1, 101) <= g_hunting_success_rate:
169:             self.hunting_result = random.randrange(1, g_food_capacity+1)
170:
171:     # Put food only if the tank is empty and nobody is using the variable "g_nb_of_worm"
172:     def deposit_food(self):
173:         global g_nb_of_worm
174:         if self.hunting_result > 0:
175:             lock_tank_fill.acquire()
176:             with lock_worm_tank:
177:                 g_nb_of_worm = self.hunting_result       # With python 3.9.5
178:                 for _ in range(self.hunting_result):     # sem_wait_eat.release(self.hunting_result) == sem_wait_eat.rele
ase(1)
179:                     sem_wait_eat.release()               # to fix this, I have use a loop
180:             logging.debug("%s is throwing up %d worm",
181:                           self.name, self.hunting_result)
182:         self.hunting_result = 0
183:
184:     # Random timer
185:     def rest(self):
186:         nap(self.speed)
187:         logging.debug("%s is taking a coffee", self.name)
188:
189:     # Unlock the routine and release the tank nest for unlock parent
190:     def mothers_sorrow(self):
191:         self.has_child = False
```

? I don't understand your comment

```python
192:            lock_tank_fill.release()
193:            logging.debug("%s is dying of sorrow", self.name)
194:
195:        # Close the thread
196:        def funeral(self):
197:            self.spirit.join()
198:            logging.debug("%s is buried", self.name)
199:
200:
201:    # Random timer
202:    def nap(bird_speed: int):
203:        threading.Event().wait((bird_speed + random.randrange(WAIT_MAX - WAIT_BIRD))/1000)
204:
205:
206:    # Initialize values
207:    def building_nest(chicks=DEFAULT_NB_CHICKS,
208:                      baby_itr=DEFAULT_BABY_ITR,
209:                      food_capacity=DEFAULT_FOOD_CAPACITY,
210:                      hunting_success_rate=DEFAULT_HUNTING_RATE):
211:        global g_nb_day_to_be_a_chicken, g_chicks, g_parents, g_food_capacity, g_hunting_success_rate
212:        g_nb_day_to_be_a_chicken = baby_itr
213:        g_food_capacity = food_capacity
214:        g_hunting_success_rate = hunting_success_rate
215:        for _ in range(chicks):
216:            g_chicks.append(Chick())
217:        for _ in range(NB_OF_PARENTS):
218:            g_parents.append(Parent())
219:
220:
221:    # Run the nest life
222:    def simulating():
223:        for chick in g_chicks:
224:            chick.born(name=names.get_first_name())
225:        for parent in g_parents:
226:            parent.born(names.get_first_name())
227:        for chick in g_chicks:
228:            chick.farewell_party()
229:        for parent in g_parents:
230:            parent.mothers_sorrow()
231:
232:
233:    # Close all threads
234:    def destroy_nest():
235:        for chick in g_chicks:
236:            chick.funeral()
237:        for parent in g_parents:
238:            parent.funeral()
239:
240:
241:    # Main function
242:    def main(args):
243:        print("Lab02 - Babybird simulation")
244:        building_nest(*args)
245:        simulating()
246:        destroy_nest()
247:        print("Lab02 - finish simulation")
248:        pass
249:
250:
251:    # Format args
252:    def parse_arg(argv):
253:        try:
254:            args_result = []
255:            for i in range(len(argv)):
256:                if check_args(i, argv[i]):
257:                    args_result.append(int(argv[i]))
258:                else:
259:                    raise ValueError
260:
261:            return args_result
262:        except ValueError:
263:            print("Error: Invalid argument, please follow usage below")
264:            print(
265:                "python3 babybird.py [chicks [baby_iter [max_food_size [hunting_success_rate]]]]")
266:            sys.exit(False)
267:
268:
269:    # check type and value of arguments. Check the number of args too
270:    def check_args(i, arg):
271:        if i >= MAX_ARGS:
272:            return False
273:        if i == SUCCESS_RATE_INDEX:
274:            return 0 <= int(arg) <= 100
275:        else:
276:            return int(arg) > 0
277:
278:
279:    # main program entry point
280:    if __name__ == "__main__":
281:        logging.basicConfig(
282:            stream=sys.stdout,
283:            format='%(relativeCreated)6d %(threadName)s %(message)s',
284:            level=logging.DEBUG
285:        )
286:        args = parse_arg(sys.argv[1:])   # remove the first element of argv
287:        main(args)
```

Handwritten annotations: "C5" (near line 203), "give some comments, please" (near lines 211-218)

```
 288:      sys.exit(True)
```

```python
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  2: # -*- coding: utf-8 -*-
  3:
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  5: #
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 10: #     http://www.apache.org/licenses/LICENSE-2.0
 11: #
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 13: # distributed under the License is distributed on an "AS IS" BASIS,
 14: # WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
 15: # See the License for the specific language governing permissions and
 16: # limitations under the License.
 17:
 18:
 19: """
 20: Test the bird simulation
 21: """
 22:
 23: __author__ = "Simon Barras"
 24: __date__ = "2021-11-12"
 25: __version__ = "0.1.0"
 26: __email__ = "simon.barras@edu.hefr.ch"
 27: __userid__ = "simon.barras"
 28:
 29:
 30: import os                         # call the file
 31: import matplotlib.pyplot as plt   # Draw graphics
 32:
 33: # Constants
 34: PYTHON_PATH = "C:/Users/simon/Envs/concurp/Scripts/python.exe"
 35: GRAPH_COLORS = {
 36:     "sleeping": "deepskyblue",
 37:     "filling": "darkviolet",
 38:     "eating": "red",
 39:     "digesting": "yellow",
 40:     "ready": "black",
 41:     "hunting": "darkorange",
 42:     "throwing": "forestgreen",
 43:     "taking": "blue",
 44:     "dying": "black",
 45:     "buried": "grey",
 46: }
 47:
 48: # Global variables
 49: g_nb_threads = 10
 50: g_max_food = 7
 51: g_nb_life = 5
 52: g_hunting_rate = 50
 53:
 54:
 55: # test if negative argument is correctly interpreted
 56: def test_not_int():
 57:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py s 5 5 80'))
 58:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 s 5 80'))
 59:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 s 80'))
 60:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 huit'))
 61:
 62:
 63: # test if negative argument is correctly interpreted
 64: def test_negative():
 65:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py -5 5 5 80'))
 66:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 -5 5 80'))
 67:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 -5 80'))
 68:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 -80'))
 69:
 70:
 71: # test out of bound arguments
 72: def test_out_of_bound():
 73:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 0 5 5 80'))
 74:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 0 5 80'))
 75:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 0 80'))
 76:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 120'))
 77:
 78:
 79: # test the bound of chicks values
 80: def test_bound_chick():
 81:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 0 5 5 80'))
 82:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py -1 5 5 80'))
 83:     assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 1 5 5 80'))
 84:
 85:
 86: # test bound of life cycle values
 87: def test_bound_life_cycle():
 88:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 0 5 80'))
 89:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 -1 5 80'))
 90:     assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 1 5 80'))
 91:
 92:
 93: # test bound of food capacity
 94: def test_bound_tank_size():
 95:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 0 80'))
 96:     assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 -1 80'))
```

```python
 97:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 1 80'))
 98:
 99:
100: # test bound of hunting rate
101: def test_bound_hunting_rate():
102:        assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 -1'))
103:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 1'))
104:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 99'))
105:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 100'))
106:        assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 101'))
107:
108:
109: # test different number of arguments
110: def test_nb_argument():
111:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py'))
112:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5'))
113:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5'))
114:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5'))
115:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 80'))
116:        assert(not os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 80 5'))
117:
118:
119: # test with big arguments but witch classic tank size's argument
120: # ! /!\ lot of time
121: def test_big_but_tank_size():
122:        #assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 1000 5 5 99'))
123:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 100 100 5 99'))
124:
125:
126: # test with big arguments but witch classic chick's argument
127: # ! /!\ lot of time
128: def test_big_but_chick():
129:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 1000 5 99'))
130:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 1000 10000 99'))
131:
132:
133: # test with big arguments but witch classic life cycle's argument
134: def test_big_but_life_cycle():
135:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 10000 99'))
136:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 10000 5 10000 99'))
137:
138:
139: # test with big arguments
140: # ! /!\ lot of time
141: def test_big_arguments():
142:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 1000 1000 100000 99'))
143:
144:
145: # the big boss of tests
146: def test_life():
147:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py 42 42 42 42'))
148:
149:
150: # test with hunting rate at 0
151: # ! /!\ Infinity loop
152: def run_infinity():
153:        assert(True)
154:        os.system(PYTHON_PATH + ' lab02/src/babybird.py 5 5 5 0')
155:        assert(False)
156:
157:
158: # test with classic values
159: # store result in a file
160: def test_ok():
161:        assert(os.system(PYTHON_PATH + ' lab02/src/babybird.py ' +
162:                        str(g_nb_threads) + ' ' + str(g_nb_life) +
163:                        ' ' + str(g_max_food) + ' ' + str(g_hunting_rate) +
164:                        ' > lab02/src/log.txt'))
165:
166:
167: # display the graph of the "test_ok()"
168: def show_graph():
169:        # Build graph
170:        fig, (ax1, ax2, ax3) = plt.subplots(3, 1, sharex=True)
171:        fig.suptitle("babybird test")
172:        ax1.set_ylabel('Thread')
173:        ax2.set_ylabel('Worm')
174:        ax3.set_xlabel('Time')
175:        ax3.set_ylabel('Chick')
176:
177:        # Initialize value
178:        global g_nb_threads
179:        nest_food = 0            # number of food in the nest
180:        last_x = 0               # last x occurrence
181:        last_eat = 0             # last x occurrence when a chicks eat
182:        nb_chicks = []           # number of chicks alive
183:        plot_tank_value = []     # plots that show the food tank evolution
184:        plot_tank_key = []       # keys for the plots "plot_tank_value"
185:        tank_cycle_value = []    # value of the tank cycle
186:        tank_cycle_key = []      # keys for the plots "tank_cycle_value"
187:
188:        # read file with the result of "test_of()"
189:        with open("lab02/src/log.txt") as fp:
190:            # read each line
191:            for line in fp:
192:                elt = line.strip().split(" ")
```

uice, but was not really asked.

```python
193:                print(line.strip())
194:                try:
195:                    # try to read the time
196:                    x = int(elt[0])   # if not a int value, this isn't an event
197:                    y = elt[2] + " " + elt[3]
198:
199:                    # add a dot at the correct position and choose the color with the action
200:                    ax1.scatter(x, y, c=GRAPH_COLORS[elt[5]])
201:
202:                    # do special action with some event
203:                    if elt[5] == "eating":   # update the nest evolution graph
204:                        # fill last lines
205:                        for i in range(last_eat, x-1):
206:                            tank_cycle_value.append(nest_food)
207:                            tank_cycle_key.append(i)
208:
209:                        # update current values
210:                        nest_food -= 1
211:                        ax2.scatter(x, nest_food, c="red")
212:                        tank_cycle_value.append(nest_food)
213:                        tank_cycle_key.append(x)
214:                        last_eat = x
215:
216:                        # add current tank evolution graph to the graphlist
217:                        if nest_food == 0:
218:                            plot_tank_value.append(tank_cycle_value)
219:                            plot_tank_key.append(tank_cycle_key)
220:                            tank_cycle_value = []
221:                            tank_cycle_key = []
222:
223:                    elif elt[5] == "throwing":
224:                        # start a new tank evolution graph
225:                        if g_nb_threads != 0:
226:                            nest_food += int(elt[7])
227:                            ax2.scatter(x, nest_food, c="forestgreen")
228:                            tank_cycle_value.append(nest_food)
229:                            tank_cycle_value.append(nest_food)
230:                            tank_cycle_key.append(x)
231:                            tank_cycle_key.append(x)
232:                            last_eat = x
233:
234:                    # update the number of chicks graph
235:                    if elt[5] == "ready":
236:                        g_nb_threads -= 1
237:                    for i in range(last_x, x):
238:                        nb_chicks.append(g_nb_threads)
239:
240:                    # add the last tank evolution graph
241:                    if g_nb_threads == 0:
242:                        plot_tank_value.append(tank_cycle_value)
243:                        plot_tank_key.append(tank_cycle_key)
244:                        tank_cycle_value = []
245:                        tank_cycle_key = []
246:
247:                    # update value
248:                    last_x = x
249:
250:                # Manage case when a line isn't an event
251:                except ValueError:
252:                    print("Not a log")
253:
254:        # fill the nest evolution graph
255:        for i in range(len(plot_tank_value)):
256:            ax2.plot(plot_tank_key[i], plot_tank_value[i])
257:        # fill the number of chicks graph
258:        ax3.plot(range(len(nb_chicks)), nb_chicks, color="black")
259:
260:        # add legend
261:        for key, val in GRAPH_COLORS.items():
262:            ax3.scatter(-1, -0, c=val, label=key)
263:        ax3.scatter(-1, 0, c="white", s=100)
264:        lines, labels = ax3.get_legend_handles_labels()
265:        fig.legend(lines, labels, loc='upper right')
266:
267:        # display the plot
268:        plt.show()
269:
270:
271: # run test that cannot be run with pytest
272: if __name__ == '__main__':
273:     # run_infinity()
274:     # test_ok()
275:     show_graph()
```

Git Logs

commit 99eb960efe7d0b77ef9ad34c3a4205cb24cfd961 (HEAD -> refs/heads/main, refs/remotes/origin/main, refs/remotes/origin/HEAD)
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 12 Nov 2021 12:13:01 +0100

    Add reference to the second solution

commit aadf46609f02a2c5bb29f34d6ac72e12087e6c1a
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 12 Nov 2021 12:11:54 +0100

    Add the reference to the branch

commit cb1cfea30f4a7dfd43c66940543bbf548e0b85da
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 12 Nov 2021 11:14:23 +0100

    Update doc

commit 87e1d882cea86bdda0161131cab1a16dbad588d3
Author: Simon Barras <simon.barras@edu.hefr.ch>
Date: Fri, 12 Nov 2021 09:59:06 +0000

    Update doc

commit 1b515ae24931cfde941a5e13ab0b4f99865e19f8
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 12 Nov 2021 10:57:10 +0100

    Update doc

commit 5509fa4443f6b3181858fe8960439094d1bbab6a
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 12 Nov 2021 10:55:10 +0100

    update docs

commit 32556af142b586a4d1a7978b02e8c9d3864c607a
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 12 Nov 2021 10:02:17 +0100

    Update check up of args

commit 63721f5fd45425dd6808f40f4fd5cb8529258270
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 5 Nov 2021 12:08:38 +0100

    update doc

commit a4dd3c9feacfb0358746c68aa09c11b2a1de2c8d
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 5 Nov 2021 11:21:09 +0100

    add tests with big values

commit 97f8a14510a0696bb9a5fb231b4094a0b84386bb
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 5 Nov 2021 11:20:54 +0100

    specify a tricky section

commit 6a91e5158e3f5b645053eb7aae7208443a67220e
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 5 Nov 2021 10:37:03 +0100

    minor update (comments, ...)

commit 369883d3c190633d049129fa2dc275d4b600bfd0
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Thu, 28 Oct 2021 01:15:26 +0200

    add a little report

commit def1d73a26005534dcf6b908186386e58f5e07b0
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Thu, 28 Oct 2021 01:15:09 +0200

    add somes test

commit 7083478f8742fa2d7d0d110e97f8e82ebbc937be
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Thu, 28 Oct 2021 01:14:44 +0200

    last update

commit 19eea1a6b489932f17675767653fce768cd37639
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Wed, 27 Oct 2021 17:16:28 +0200

    update nap

commit 748ed62ac77c72b57b44ebfc6aa19199c6290413
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Wed, 27 Oct 2021 16:28:00 +0200

    fix magic numbers

commit c2beca57c7605b01fc9e94fd0e1919b1f994983b
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Wed, 27 Oct 2021 15:24:55 +0200

    add comment on tests

commit eb028d24aa37dd7ec7c2ca91a4f088d8a9fd4b7b
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Wed, 27 Oct 2021 14:37:17 +0200

    add comments

commit d530e0b26c4bdd7fb7c686ee260b1e44c4d86d58
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 22 Oct 2021 11:20:52 +0200

    renaming variables

commit 647f875da35aa60af52e98cb7fa21df2197cd2ce
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 22 Oct 2021 11:12:13 +0200

    reformat code

commit e906cf5ba4086728f5915a64dc128dcf3d564621
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 22 Oct 2021 10:04:33 +0200

    fix bug to many argument

commit 55d046458a50494e410b40b42b8f72258af7c71f
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 22 Oct 2021 09:38:52 +0200

    update gitignore

commit f0c9d9d9106c675f01bbe74cb3a4c05e84142a7b
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 22 Oct 2021 09:38:12 +0200

    add coding test

commit c49112a199a139f10f4d019093e45602223be1e5
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 22 Oct 2021 09:33:08 +0200

    fix bound bug for tank size

commit 742146e7a6cd71d6e5b7e700ef7046020264676c
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Fri, 22 Oct 2021 09:17:03 +0200

    update graphic

---

commit e1353bc0a3b27cb2b32306c8259fdab6c7f36336
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Thu, 21 Oct 2021 16:48:16 +0200

    add test

---

commit 6116f5ec39ab3ee7afde3da98d535c380852a1de
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Wed, 20 Oct 2021 17:06:31 +0200

    add argument management

---

commit b1cd180af84e4f927a6d4d14bac57180cf5ecd78
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Wed, 20 Oct 2021 14:07:06 +0200

    add requirements.txt

---

commit 0ee095f48d2dd768aa806a7636a07cb3a39e2cce
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Wed, 20 Oct 2021 14:06:50 +0200

    fix last bugs

---

commit 75fe117895f214b9c4500aa2ea9f4c6ac274ac82
Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Wed, 20 Oct 2021 11:04:08 +0200

    add random names

---

commit 233c37d42e29eaa5719d2dc2cc4f5ea6363f5c58

Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Wed, 20 Oct 2021 10:55:13 +0200

    fix deadlock of parent

Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Tue, 19 Oct 2021 22:25:33 +0200

    fixing parent don't die at the end

Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Tue, 19 Oct 2021 22:20:53 +0200

    add management of the stock

Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Tue, 19 Oct 2021 17:38:44 +0200

    add semaphore to wait until no chick left

Author: Simon Barras <66463606+simbarras@users.noreply.github.com>
Date: Tue, 19 Oct 2021 15:39:29 +0200

    add thread's parent class

Run params: 1-1-1-0

```
Lab02 - Babybird simulation
     3 Thread-1 (live) Chick Christine is sleeping
     4 Thread-2 (live) Parent Donald is hunting
     4 Thread-3 (live) Parent Marco is hunting
    17 Thread-1 (live) Chick Christine is filling his plate
    19 Thread-3 (live) Parent Marco is taking a coffee
    19 Thread-3 (live) Parent Marco is hunting
    56 Thread-3 (live) Parent Marco is taking a coffee
    56 Thread-3 (live) Parent Marco is hunting
    63 Thread-2 (live) Parent Donald is taking a coffee
    63 Thread-2 (live) Parent Donald is hunting
   107 Thread-2 (live) Parent Donald is taking a coffee
   107 Thread-3 (live) Parent Marco is taking a coffee
   107 Thread-3 (live) Parent Marco is hunting
   107 Thread-2 (live) Parent Donald is hunting
   146 Thread-3 (live) Parent Marco is taking a coffee
   146 Thread-3 (live) Parent Marco is hunting
   156 Thread-2 (live) Parent Donald is taking a coffee
   156 Thread-2 (live) Parent Donald is hunting
   203 Thread-2 (live) Parent Donald is taking a coffee
   204 Thread-3 (live) Parent Marco is taking a coffee
   204 Thread-2 (live) Parent Donald is hunting
   204 Thread-3 (live) Parent Marco is hunting
   242 Thread-2 (live) Parent Donald is taking a coffee
   242 Thread-2 (live) Parent Donald is hunting
   260 Thread-3 (live) Parent Marco is taking a coffee
   260 Thread-3 (live) Parent Marco is hunting
   273 Thread-3 (live) Parent Marco is taking a coffee
   273 Thread-3 (live) Parent Marco is hunting
   289 Thread-3 (live) Parent Marco is taking a coffee
   290 Thread-3 (live) Parent Marco is hunting
   301 Thread-2 (live) Parent Donald is taking a coffee
   301 Thread-2 (live) Parent Donald is hunting
   339 Thread-3 (live) Parent Marco is taking a coffee
   339 Thread-3 (live) Parent Marco is hunting
   346 Thread-2 (live) Parent Donald is taking a coffee
   346 Thread-2 (live) Parent Donald is hunting
   409 Thread-2 (live) Parent Donald is taking a coffee
   409 Thread-2 (live) Parent Donald is hunting
   417 Thread-3 (live) Parent Marco is taking a coffee
   417 Thread-3 (live) Parent Marco is hunting
   427 Thread-2 (live) Parent Donald is taking a coffee
   427 Thread-2 (live) Parent Donald is hunting
   452 Thread-3 (live) Parent Marco is taking a coffee
   452 Thread-3 (live) Parent Marco is hunting
   486 Thread-3 (live) Parent Marco is taking a coffee
   486 Thread-3 (live) Parent Marco is hunting
   492 Thread-2 (live) Parent Donald is taking a coffee
   492 Thread-2 (live) Parent Donald is hunting
   542 Thread-2 (live) Parent Donald is taking a coffee
   542 Thread-2 (live) Parent Donald is hunting
   551 Thread-3 (live) Parent Marco is taking a coffee
   552 Thread-3 (live) Parent Marco is hunting
   584 Thread-2 (live) Parent Donald is taking a coffee
   584 Thread-2 (live) Parent Donald is hunting
   596 Thread-3 (live) Parent Marco is taking a coffee
   597 Thread-3 (live) Parent Marco is hunting
```

```
  642 Thread-2 (live) Parent Donald is taking a coffee
  642 Thread-2 (live) Parent Donald is hunting
  648 Thread-3 (live) Parent Marco is taking a coffee
  648 Thread-3 (live) Parent Marco is hunting
  678 Thread-3 (live) Parent Marco is taking a coffee
  678 Thread-3 (live) Parent Marco is hunting
  694 Thread-2 (live) Parent Donald is taking a coffee
  694 Thread-2 (live) Parent Donald is hunting
  739 Thread-3 (live) Parent Marco is taking a coffee
  739 Thread-2 (live) Parent Donald is taking a coffee
  739 Thread-2 (live) Parent Donald is hunting
  739 Thread-3 (live) Parent Marco is hunting
  749 Thread-3 (live) Parent Marco is taking a coffee
  749 Thread-3 (live) Parent Marco is hunting
  761 Thread-2 (live) Parent Donald is taking a coffee
  761 Thread-2 (live) Parent Donald is hunting
  784 Thread-3 (live) Parent Marco is taking a coffee
  784 Thread-3 (live) Parent Marco is hunting

#######
#########################..... 5118 lines skipped ......###########################
#######

 59123 Thread-3 (live) Parent Marco is taking a coffee
 59123 Thread-2 (live) Parent Donald is taking a coffee
 59123 Thread-3 (live) Parent Marco is hunting
 59123 Thread-2 (live) Parent Donald is hunting
 59173 Thread-2 (live) Parent Donald is taking a coffee
 59174 Thread-2 (live) Parent Donald is hunting
 59174 Thread-3 (live) Parent Marco is taking a coffee
 59174 Thread-3 (live) Parent Marco is hunting
 59214 Thread-2 (live) Parent Donald is taking a coffee
 59214 Thread-2 (live) Parent Donald is hunting
 59216 Thread-3 (live) Parent Marco is taking a coffee
 59217 Thread-3 (live) Parent Marco is hunting
 59275 Thread-3 (live) Parent Marco is taking a coffee
 59275 Thread-3 (live) Parent Marco is hunting
 59283 Thread-2 (live) Parent Donald is taking a coffee
 59283 Thread-2 (live) Parent Donald is hunting
 59317 Thread-3 (live) Parent Marco is taking a coffee
 59317 Thread-3 (live) Parent Marco is hunting
 59353 Thread-2 (live) Parent Donald is taking a coffee
 59354 Thread-2 (live) Parent Donald is hunting
 59376 Thread-3 (live) Parent Marco is taking a coffee
 59376 Thread-3 (live) Parent Marco is hunting
 59413 Thread-3 (live) Parent Marco is taking a coffee
 59414 Thread-3 (live) Parent Marco is hunting
 59428 Thread-2 (live) Parent Donald is taking a coffee
 59429 Thread-2 (live) Parent Donald is hunting
 59442 Thread-2 (live) Parent Donald is taking a coffee
 59442 Thread-2 (live) Parent Donald is hunting
 59447 Thread-3 (live) Parent Marco is taking a coffee
 59448 Thread-3 (live) Parent Marco is hunting
 59473 Thread-3 (live) Parent Marco is taking a coffee
 59474 Thread-3 (live) Parent Marco is hunting
 59512 Thread-2 (live) Parent Donald is taking a coffee
 59512 Thread-2 (live) Parent Donald is hunting
 59519 Thread-3 (live) Parent Marco is taking a coffee
 59519 Thread-3 (live) Parent Marco is hunting
```

```
59550 Thread-2 (live) Parent Donald is taking a coffee
59551 Thread-2 (live) Parent Donald is hunting
59555 Thread-3 (live) Parent Marco is taking a coffee
59556 Thread-3 (live) Parent Marco is hunting
59617 Thread-3 (live) Parent Marco is taking a coffee
59617 Thread-3 (live) Parent Marco is hunting
59629 Thread-2 (live) Parent Donald is taking a coffee
59629 Thread-2 (live) Parent Donald is hunting
59649 Thread-3 (live) Parent Marco is taking a coffee
59649 Thread-3 (live) Parent Marco is hunting
59658 Thread-3 (live) Parent Marco is taking a coffee
59659 Thread-3 (live) Parent Marco is hunting
59683 Thread-2 (live) Parent Donald is taking a coffee
59683 Thread-2 (live) Parent Donald is hunting
59697 Thread-3 (live) Parent Marco is taking a coffee
59697 Thread-3 (live) Parent Marco is hunting
59707 Thread-2 (live) Parent Donald is taking a coffee
59707 Thread-2 (live) Parent Donald is hunting
59723 Thread-3 (live) Parent Marco is taking a coffee
59724 Thread-3 (live) Parent Marco is hunting
59748 Thread-3 (live) Parent Marco is taking a coffee
59748 Thread-3 (live) Parent Marco is hunting
59760 Thread-2 (live) Parent Donald is taking a coffee
59760 Thread-2 (live) Parent Donald is hunting
59773 Thread-3 (live) Parent Marco is taking a coffee
59774 Thread-3 (live) Parent Marco is hunting
59803 Thread-2 (live) Parent Donald is taking a coffee
59804 Thread-2 (live) Parent Donald is hunting
59841 Thread-2 (live) Parent Donald is taking a coffee
59842 Thread-2 (live) Parent Donald is hunting
59845 Thread-3 (live) Parent Marco is taking a coffee
59845 Thread-3 (live) Parent Marco is hunting
59894 Thread-3 (live) Parent Marco is taking a coffee
59894 Thread-3 (live) Parent Marco is hunting
59901 Thread-2 (live) Parent Donald is taking a coffee
59901 Thread-2 (live) Parent Donald is hunting
59945 Thread-3 (live) Parent Marco is taking a coffee
59945 Thread-3 (live) Parent Marco is hunting
gtimeout: sending signal TERM to command 'python3'
```

Run params: 1-1-1-100

```
Lab02 - Babybird simulation
     3 Thread-1 (live) Chick Robin is sleeping
     3 Thread-2 (live) Parent Diana is hunting
     4 Thread-3 (live) Parent Keith is hunting
    10 Thread-3 (live) Parent Keith is throwing up 1 worm
    30 Thread-1 (live) Chick Robin is filling his plate
    30 Thread-1 (live) Chick Robin is eating
    44 Thread-2 (live) Parent Diana is throwing up 1 worm
    55 Thread-3 (live) Parent Keith is taking a coffee
    55 Thread-3 (live) Parent Keith is hunting
    74 Thread-1 (live) Chick Robin is digesting
    78 Thread-2 (live) Parent Diana is taking a coffee
    78 Thread-2 (live) Parent Diana is hunting
    96 Thread-1 (live) Chick Robin is ready to take the plunge
    97 MainThread Parent Diana is dying of sorrow
    97 MainThread Parent Keith is dying of sorrow
    97 MainThread Chick Robin is buried
    97 Thread-3 (live) Parent Keith is throwing up 1 worm
    97 Thread-2 (live) Parent Diana is throwing up 1 worm
   128 Thread-3 (live) Parent Keith is taking a coffee
   133 Thread-2 (live) Parent Diana is taking a coffee
   133 MainThread Parent Diana is buried
   133 MainThread Parent Keith is buried
Lab02 - finish simulation
```

Run params: 1-1-1-200

```
Error: Invalid argument, please follow usage below
python3 babybird.py [chicks [baby_iter [max_food_size [hunting_success_rate]]]]
```

Run params: 1-2-10000-100

```
Lab02 - Babybird simulation
     3 Thread-1 (live) Chick Russell is sleeping
     4 Thread-2 (live) Parent Brenda is hunting
     4 Thread-3 (live) Parent John is hunting
    20 Thread-2 (live) Parent Brenda is throwing up 7369 worm
    23 Thread-1 (live) Chick Russell is filling his plate
    23 Thread-1 (live) Chick Russell is eating
    42 Thread-1 (live) Chick Russell is digesting
    52 Thread-2 (live) Parent Brenda is taking a coffee
    52 Thread-2 (live) Parent Brenda is hunting
    72 Thread-1 (live) Chick Russell is sleeping
   119 Thread-1 (live) Chick Russell is filling his plate
   120 Thread-1 (live) Chick Russell is eating
   152 Thread-1 (live) Chick Russell is digesting
   179 Thread-1 (live) Chick Russell is ready to take the plunge
   180 MainThread Parent Brenda is dying of sorrow
   180 MainThread Parent John is dying of sorrow
   180 MainThread Chick Russell is buried
   189 Thread-2 (live) Parent Brenda is throwing up 3986 worm
   196 Thread-3 (live) Parent John is throwing up 3899 worm
   196 Thread-2 (live) Parent Brenda is taking a coffee
   196 MainThread Parent Brenda is buried
   230 Thread-3 (live) Parent John is taking a coffee
   230 MainThread Parent John is buried
Lab02 - finish simulation
```

Run params: 2-1-1-10

```
Lab02 - Babybird simulation
     3 Thread-1 (live) Chick Stephen is sleeping
     3 Thread-2 (live) Chick Jordan is sleeping
     3 Thread-3 (live) Parent George is hunting
     4 Thread-4 (live) Parent Brenda is hunting
    21 Thread-1 (live) Chick Stephen is filling his plate
    48 Thread-2 (live) Chick Jordan is filling his plate
    69 Thread-3 (live) Parent George is taking a coffee
    69 Thread-3 (live) Parent George is hunting
    80 Thread-4 (live) Parent Brenda is taking a coffee
    80 Thread-4 (live) Parent Brenda is hunting
   121 Thread-3 (live) Parent George is taking a coffee
   121 Thread-3 (live) Parent George is hunting
   121 Thread-4 (live) Parent Brenda is taking a coffee
   121 Thread-4 (live) Parent Brenda is hunting
   165 Thread-3 (live) Parent George is taking a coffee
   165 Thread-3 (live) Parent George is hunting
   179 Thread-3 (live) Parent George is taking a coffee
   179 Thread-3 (live) Parent George is hunting
   193 Thread-4 (live) Parent Brenda is taking a coffee
   193 Thread-4 (live) Parent Brenda is hunting
   232 Thread-3 (live) Parent George is taking a coffee
   232 Thread-3 (live) Parent George is hunting
   252 Thread-4 (live) Parent Brenda is taking a coffee
   252 Thread-4 (live) Parent Brenda is hunting
   266 Thread-4 (live) Parent Brenda is taking a coffee
   266 Thread-4 (live) Parent Brenda is hunting
   307 Thread-3 (live) Parent George is taking a coffee
   307 Thread-3 (live) Parent George is hunting
   328 Thread-4 (live) Parent Brenda is taking a coffee
   328 Thread-4 (live) Parent Brenda is hunting
   356 Thread-3 (live) Parent George is taking a coffee
   356 Thread-3 (live) Parent George is hunting
   372 Thread-4 (live) Parent Brenda is taking a coffee
   372 Thread-4 (live) Parent Brenda is hunting
   396 Thread-3 (live) Parent George is taking a coffee
   396 Thread-3 (live) Parent George is hunting
   416 Thread-4 (live) Parent Brenda is taking a coffee
   416 Thread-4 (live) Parent Brenda is hunting
   445 Thread-4 (live) Parent Brenda is taking a coffee
   445 Thread-4 (live) Parent Brenda is hunting
   461 Thread-4 (live) Parent Brenda is taking a coffee
   461 Thread-4 (live) Parent Brenda is hunting
   463 Thread-3 (live) Parent George is taking a coffee
   463 Thread-3 (live) Parent George is hunting
   515 Thread-3 (live) Parent George is taking a coffee
   515 Thread-3 (live) Parent George is hunting
   533 Thread-4 (live) Parent Brenda is taking a coffee
   533 Thread-4 (live) Parent Brenda is hunting
   573 Thread-3 (live) Parent George is taking a coffee
   573 Thread-3 (live) Parent George is hunting
   619 Thread-4 (live) Parent Brenda is taking a coffee
   619 Thread-4 (live) Parent Brenda is hunting
   646 Thread-3 (live) Parent George is taking a coffee
   647 Thread-3 (live) Parent George is hunting
   667 Thread-4 (live) Parent Brenda is taking a coffee
   668 Thread-4 (live) Parent Brenda is hunting
```

```
 672 Thread-3 (live) Parent George is taking a coffee
 672 Thread-3 (live) Parent George is hunting
 693 Thread-4 (live) Parent Brenda is taking a coffee
 693 Thread-4 (live) Parent Brenda is hunting
 744 Thread-3 (live) Parent George is taking a coffee
 745 Thread-3 (live) Parent George is hunting
 772 Thread-4 (live) Parent Brenda is taking a coffee
 772 Thread-4 (live) Parent Brenda is hunting
 794 Thread-3 (live) Parent George is taking a coffee
 794 Thread-3 (live) Parent George is hunting
 820 Thread-4 (live) Parent Brenda is taking a coffee
 820 Thread-4 (live) Parent Brenda is hunting
 862 Thread-3 (live) Parent George is taking a coffee
 862 Thread-3 (live) Parent George is hunting
 867 Thread-4 (live) Parent Brenda is taking a coffee
 867 Thread-4 (live) Parent Brenda is hunting
 908 Thread-4 (live) Parent Brenda is taking a coffee
 908 Thread-4 (live) Parent Brenda is hunting
 916 Thread-3 (live) Parent George is taking a coffee
 916 Thread-3 (live) Parent George is hunting
 972 Thread-3 (live) Parent George is taking a coffee
 972 Thread-3 (live) Parent George is hunting
 987 Thread-4 (live) Parent Brenda is taking a coffee
 988 Thread-4 (live) Parent Brenda is hunting
1010 Thread-3 (live) Parent George is taking a coffee
1010 Thread-3 (live) Parent George is hunting
1019 Thread-4 (live) Parent Brenda is taking a coffee
1019 Thread-4 (live) Parent Brenda is hunting
1055 Thread-3 (live) Parent George is taking a coffee
1055 Thread-3 (live) Parent George is hunting
1066 Thread-3 (live) Parent George is throwing up 1 worm
1066 Thread-1 (live) Chick Stephen is eating
1075 Thread-4 (live) Parent Brenda is taking a coffee
1076 Thread-4 (live) Parent Brenda is hunting
1085 Thread-1 (live) Chick Stephen is digesting
1113 Thread-3 (live) Parent George is taking a coffee
1113 Thread-3 (live) Parent George is hunting
1128 Thread-1 (live) Chick Stephen is ready to take the plunge
1147 Thread-4 (live) Parent Brenda is taking a coffee
1147 Thread-4 (live) Parent Brenda is hunting
1164 Thread-3 (live) Parent George is taking a coffee
1164 Thread-3 (live) Parent George is hunting
1172 Thread-4 (live) Parent Brenda is taking a coffee
1172 Thread-4 (live) Parent Brenda is hunting
1177 Thread-3 (live) Parent George is throwing up 1 worm
1177 Thread-2 (live) Chick Jordan is eating
1184 Thread-3 (live) Parent George is taking a coffee
1184 Thread-3 (live) Parent George is hunting
1203 Thread-2 (live) Chick Jordan is digesting
1219 Thread-4 (live) Parent Brenda is taking a coffee
1219 Thread-4 (live) Parent Brenda is hunting
1226 Thread-2 (live) Chick Jordan is ready to take the plunge
1227 MainThread Parent George is dying of sorrow
1227 MainThread Parent Brenda is dying of sorrow
1227 MainThread Chick Stephen is buried
1227 MainThread Chick Jordan is buried
1245 Thread-3 (live) Parent George is taking a coffee
1245 MainThread Parent George is buried
1246 Thread-4 (live) Parent Brenda is taking a coffee
```

```
   1246 MainThread Parent Brenda is buried
Lab02 - finish simulation
```

Run params: 5-2-5-50

```
Lab02 - Babybird simulation
     2 Thread-1 (live) Chick James is sleeping
     5 Thread-2 (live) Chick Latarsha is sleeping
     5 Thread-3 (live) Chick Ericka is sleeping
     5 Thread-4 (live) Chick Stephanie is sleeping
     6 Thread-5 (live) Chick Suzanne is sleeping
     6 Thread-6 (live) Parent John is hunting
     6 Thread-7 (live) Parent Deborah is hunting
    20 Thread-5 (live) Chick Suzanne is filling his plate
    22 Thread-3 (live) Chick Ericka is filling his plate
    26 Thread-6 (live) Parent John is throwing up 5 worm
    26 Thread-5 (live) Chick Suzanne is eating
    26 Thread-3 (live) Chick Ericka is eating
    37 Thread-2 (live) Chick Latarsha is filling his plate
    37 Thread-2 (live) Chick Latarsha is eating
    37 Thread-1 (live) Chick James is filling his plate
    37 Thread-1 (live) Chick James is eating
    44 Thread-4 (live) Chick Stephanie is filling his plate
    44 Thread-4 (live) Chick Stephanie is eating
    44 Thread-7 (live) Parent Deborah is throwing up 1 worm
    48 Thread-5 (live) Chick Suzanne is digesting
    55 Thread-3 (live) Chick Ericka is digesting
    57 Thread-1 (live) Chick James is digesting
    58 Thread-6 (live) Parent John is taking a coffee
    58 Thread-6 (live) Parent John is hunting
    59 Thread-7 (live) Parent Deborah is taking a coffee
    59 Thread-7 (live) Parent Deborah is hunting
    67 Thread-4 (live) Chick Stephanie is digesting
    71 Thread-1 (live) Chick James is sleeping
    79 Thread-2 (live) Chick Latarsha is digesting
    80 Thread-5 (live) Chick Suzanne is sleeping
    89 Thread-5 (live) Chick Suzanne is filling his plate
    89 Thread-5 (live) Chick Suzanne is eating
    91 Thread-6 (live) Parent John is taking a coffee
    91 Thread-6 (live) Parent John is hunting
    95 Thread-7 (live) Parent Deborah is throwing up 1 worm
    98 Thread-3 (live) Chick Ericka is sleeping
   105 Thread-7 (live) Parent Deborah is taking a coffee
   105 Thread-7 (live) Parent Deborah is hunting
   110 Thread-4 (live) Chick Stephanie is sleeping
   112 Thread-5 (live) Chick Suzanne is digesting
   117 Thread-3 (live) Chick Ericka is filling his plate
   117 Thread-3 (live) Chick Ericka is eating
   118 Thread-1 (live) Chick James is filling his plate
   120 Thread-2 (live) Chick Latarsha is sleeping
   123 Thread-4 (live) Chick Stephanie is filling his plate
   125 Thread-3 (live) Chick Ericka is digesting
   133 Thread-7 (live) Parent Deborah is throwing up 3 worm
   133 Thread-4 (live) Chick Stephanie is eating
   133 Thread-1 (live) Chick James is eating
   147 Thread-3 (live) Chick Ericka is ready to take the plunge
   154 Thread-5 (live) Chick Suzanne is ready to take the plunge
   157 Thread-4 (live) Chick Stephanie is digesting
   161 Thread-2 (live) Chick Latarsha is filling his plate
   161 Thread-2 (live) Chick Latarsha is eating
   161 Thread-6 (live) Parent John is throwing up 3 worm
   171 Thread-1 (live) Chick James is digesting
```

```
172 Thread-6 (live) Parent John is taking a coffee
172 Thread-6 (live) Parent John is hunting
172 Thread-7 (live) Parent Deborah is taking a coffee
172 Thread-7 (live) Parent Deborah is hunting
193 Thread-4 (live) Chick Stephanie is ready to take the plunge
198 Thread-1 (live) Chick James is ready to take the plunge
200 Thread-2 (live) Chick Latarsha is digesting
202 Thread-7 (live) Parent Deborah is taking a coffee
202 Thread-7 (live) Parent Deborah is hunting
214 Thread-2 (live) Chick Latarsha is ready to take the plunge
214 MainThread Parent John is dying of sorrow
214 MainThread Parent Deborah is dying of sorrow
214 Thread-6 (live) Parent John is throwing up 1 worm
214 MainThread Chick James is buried
214 MainThread Chick Latarsha is buried
214 MainThread Chick Ericka is buried
214 MainThread Chick Stephanie is buried
214 MainThread Chick Suzanne is buried
218 Thread-6 (live) Parent John is taking a coffee
218 MainThread Parent John is buried
244 Thread-7 (live) Parent Deborah is taking a coffee
244 MainThread Parent Deborah is buried
Lab02 - finish simulation
```

Run params: default

```
Lab02 - Babybird simulation
    3 Thread-1 (live) Chick Michael is sleeping
    4 Thread-2 (live) Chick Crystal is sleeping
    4 Thread-3 (live) Chick Gladys is sleeping
    4 Thread-4 (live) Chick Melissa is sleeping
    5 Thread-5 (live) Chick Laura is sleeping
    5 Thread-6 (live) Chick Cheryl is sleeping
    5 Thread-7 (live) Chick Johnny is sleeping
    5 Thread-8 (live) Chick Kathy is sleeping
    6 Thread-9 (live) Chick Robert is sleeping
    6 Thread-10 (live) Chick Thomas is sleeping
    7 Thread-11 (live) Chick Darcy is sleeping
    7 Thread-12 (live) Chick Audrey is sleeping
    7 Thread-13 (live) Chick Jose is sleeping
    7 Thread-14 (live) Chick Helen is sleeping
    8 Thread-15 (live) Chick Christine is sleeping
    8 Thread-16 (live) Chick Dale is sleeping
    8 Thread-17 (live) Chick Robert is sleeping
    8 Thread-18 (live) Parent Gilbert is hunting
    9 Thread-19 (live) Parent Duane is hunting
   14 Thread-6 (live) Chick Cheryl is filling his plate
   14 Thread-2 (live) Chick Crystal is filling his plate
   20 Thread-3 (live) Chick Gladys is filling his plate
   20 Thread-14 (live) Chick Helen is filling his plate
   24 Thread-12 (live) Chick Audrey is filling his plate
   24 Thread-9 (live) Chick Robert is filling his plate
   33 Thread-8 (live) Chick Kathy is filling his plate
   33 Thread-7 (live) Chick Johnny is filling his plate
   40 Thread-13 (live) Chick Jose is filling his plate
   40 Thread-11 (live) Chick Darcy is filling his plate
   40 Thread-1 (live) Chick Michael is filling his plate
   40 Thread-19 (live) Parent Duane is taking a coffee
   40 Thread-19 (live) Parent Duane is hunting
   49 Thread-10 (live) Chick Thomas is filling his plate
   49 Thread-16 (live) Chick Dale is filling his plate
   49 Thread-17 (live) Chick Robert is filling his plate
   49 Thread-5 (live) Chick Laura is filling his plate
   55 Thread-4 (live) Chick Melissa is filling his plate
   55 Thread-15 (live) Chick Christine is filling his plate
   56 Thread-18 (live) Parent Gilbert is throwing up 7 worm
   56 Thread-4 (live) Chick Melissa is eating
   56 Thread-6 (live) Chick Cheryl is eating `
   56 Thread-2 (live) Chick Crystal is eating
   56 Thread-3 (live) Chick Gladys is eating`
   56 Thread-12 (live) Chick Audrey is eating
   56 Thread-14 (live) Chick Helen is eating
   56 Thread-9 (live) Chick Robert is eating
   72 Thread-19 (live) Parent Duane is throwing up 2 worm
   72 Thread-13 (live) Chick Jose is eating   -
   72 Thread-7 (live) Chick Johnny is eating ´
   76 Thread-2 (live) Chick Crystal is digesting
   77 Thread-19 (live) Parent Duane is taking a coffee
   77 Thread-19 (live) Parent Duane is hunting
   78 Thread-7 (live) Chick Johnny is digesting
   83 Thread-9 (live) Chick Robert is digesting
   83 Thread-6 (live) Chick Cheryl is digesting
   83 Thread-2 (live) Chick Crystal is sleeping
```

```
 91 Thread-3 (live) Chick Gladys is digesting
 91 Thread-12 (live) Chick Audrey is digesting
 99 Thread-14 (live) Chick Helen is digesting
 99 Thread-12 (live) Chick Audrey is sleeping
100 Thread-4 (live) Chick Melissa is digesting
101 Thread-18 (live) Parent Gilbert is taking a coffee
101 Thread-18 (live) Parent Gilbert is hunting
109 Thread-2 (live) Chick Crystal is filling his plate
117 Thread-18 (live) Parent Gilbert is throwing up 3 worm
117 Thread-11 (live) Chick Darcy is eating
117 Thread-1 (live) Chick Michael is eating
117 Thread-10 (live) Chick Thomas is eating
118 Thread-13 (live) Chick Jose is digesting
119 Thread-7 (live) Chick Johnny is sleeping
122 Thread-4 (live) Chick Melissa is sleeping
122 Thread-6 (live) Chick Cheryl is sleeping
127 Thread-6 (live) Chick Cheryl is filling his plate
127 Thread-12 (live) Chick Audrey is filling his plate
128 Thread-9 (live) Chick Robert is sleeping
132 Thread-7 (live) Chick Johnny is filling his plate
133 Thread-3 (live) Chick Gladys is sleeping
140 Thread-11 (live) Chick Darcy is digesting
143 Thread-14 (live) Chick Helen is sleeping
149 Thread-1 (live) Chick Michael is digesting
150 Thread-4 (live) Chick Melissa is filling his plate
150 Thread-19 (live) Parent Duane is taking a coffee
150 Thread-19 (live) Parent Duane is hunting
155 Thread-18 (live) Parent Gilbert is taking a coffee
156 Thread-18 (live) Parent Gilbert is hunting
157 Thread-13 (live) Chick Jose is sleeping
159 Thread-10 (live) Chick Thomas is digesting
166 Thread-14 (live) Chick Helen is filling his plate
167 Thread-1 (live) Chick Michael is sleeping
169 Thread-13 (live) Chick Jose is filling his plate
170 Thread-18 (live) Parent Gilbert is throwing up 3 worm
170 Thread-16 (live) Chick Dale is eating
170 Thread-17 (live) Chick Robert is eating
170 Thread-5 (live) Chick Laura is eating
175 Thread-18 (live) Parent Gilbert is taking a coffee
175 Thread-3 (live) Chick Gladys is filling his plate
176 Thread-9 (live) Chick Robert is filling his plate
176 Thread-18 (live) Parent Gilbert is hunting
184 Thread-19 (live) Parent Duane is throwing up 5 worm
184 Thread-8 (live) Chick Kathy is eating
184 Thread-2 (live) Chick Crystal is eating
184 Thread-15 (live) Chick Christine is eating
184 Thread-6 (live) Chick Cheryl is eating
184 Thread-12 (live) Chick Audrey is eating
184 Thread-11 (live) Chick Darcy is sleeping
185 Thread-5 (live) Chick Laura is digesting
194 Thread-19 (live) Parent Duane is taking a coffee
194 Thread-1 (live) Chick Michael is filling his plate
194 Thread-17 (live) Chick Robert is digesting
194 Thread-19 (live) Parent Duane is hunting
196 Thread-11 (live) Chick Darcy is filling his plate
199 Thread-6 (live) Chick Cheryl is digesting
199 Thread-5 (live) Chick Laura is sleeping
203 Thread-6 (live) Chick Cheryl is sleeping
203 Thread-12 (live) Chick Audrey is digesting
```

```
203 Thread-10 (live) Chick Thomas is sleeping
210 Thread-2 (live) Chick Crystal is digesting
210 Thread-16 (live) Chick Dale is digesting
210 Thread-17 (live) Chick Robert is sleeping
211 Thread-15 (live) Chick Christine is digesting
217 Thread-5 (live) Chick Laura is filling his plate
219 Thread-8 (live) Chick Kathy is digesting
223 Thread-12 (live) Chick Audrey is sleeping
223 Thread-19 (live) Parent Duane is throwing up 5 worm
224 Thread-17 (live) Chick Robert is filling his plate
224 Thread-17 (live) Chick Robert is eating
224 Thread-4 (live) Chick Melissa is eating
224 Thread-14 (live) Chick Helen is eating
224 Thread-13 (live) Chick Jose is eating
224 Thread-7 (live) Chick Johnny is eating
232 Thread-4 (live) Chick Melissa is digesting
233 Thread-17 (live) Chick Robert is digesting
233 Thread-6 (live) Chick Cheryl is filling his plate
235 Thread-16 (live) Chick Dale is sleeping
241 Thread-19 (live) Parent Duane is taking a coffee
241 Thread-19 (live) Parent Duane is hunting
243 Thread-8 (live) Chick Kathy is sleeping
249 Thread-19 (live) Parent Duane is throwing up 4 worm
250 Thread-9 (live) Chick Robert is eating
250 Thread-11 (live) Chick Darcy is eating
250 Thread-5 (live) Chick Laura is eating
250 Thread-1 (live) Chick Michael is eating
250 Thread-16 (live) Chick Dale is filling his plate
251 Thread-10 (live) Chick Thomas is filling his plate
257 Thread-17 (live) Chick Robert is sleeping
259 Thread-2 (live) Chick Crystal is sleeping
260 Thread-15 (live) Chick Christine is sleeping
264 Thread-14 (live) Chick Helen is digesting
266 Thread-18 (live) Parent Gilbert is taking a coffee
266 Thread-7 (live) Chick Johnny is digesting
266 Thread-18 (live) Parent Gilbert is hunting
266 Thread-13 (live) Chick Jose is digesting
269 Thread-7 (live) Chick Johnny is sleeping
271 Thread-12 (live) Chick Audrey is filling his plate
271 Thread-19 (live) Parent Duane is taking a coffee
271 Thread-19 (live) Parent Duane is hunting
274 Thread-14 (live) Chick Helen is sleeping
274 Thread-11 (live) Chick Darcy is digesting
276 Thread-4 (live) Chick Melissa is sleeping
282 Thread-15 (live) Chick Christine is filling his plate
283 Thread-17 (live) Chick Robert is filling his plate
284 Thread-11 (live) Chick Darcy is sleeping
284 Thread-1 (live) Chick Michael is digesting
285 Thread-13 (live) Chick Jose is sleeping
289 Thread-9 (live) Chick Robert is digesting
292 Thread-8 (live) Chick Kathy is filling his plate
299 Thread-5 (live) Chick Laura is digesting
300 Thread-7 (live) Chick Johnny is filling his plate
301 Thread-13 (live) Chick Jose is filling his plate
305 Thread-14 (live) Chick Helen is filling his plate
305 Thread-2 (live) Chick Crystal is filling his plate
311 Thread-9 (live) Chick Robert is sleeping
311 Thread-11 (live) Chick Darcy is filling his plate
320 Thread-1 (live) Chick Michael is sleeping
```

```
 322 Thread-9  (live) Chick Robert is filling his plate
 326 Thread-4  (live) Chick Melissa is filling his plate
 327 Thread-18 (live) Parent Gilbert is taking a coffee
 327 Thread-18 (live) Parent Gilbert is hunting
 339 Thread-5  (live) Chick Laura is sleeping
 340 Thread-1  (live) Chick Michael is filling his plate
 358 Thread-19 (live) Parent Duane is taking a coffee
 359 Thread-19 (live) Parent Duane is hunting
 367 Thread-18 (live) Parent Gilbert is throwing up 6 worm
 367 Thread-3  (live) Chick Gladys is eating
 367 Thread-6  (live) Chick Cheryl is eating
 367 Thread-10 (live) Chick Thomas is eating
 367 Thread-15 (live) Chick Christine is eating
 367 Thread-16 (live) Chick Dale is eating
 367 Thread-12 (live) Chick Audrey is eating
 384 Thread-16 (live) Chick Dale is digesting
 390 Thread-18 (live) Parent Gilbert is taking a coffee
 390 Thread-5  (live) Chick Laura is filling his plate
 390 Thread-18 (live) Parent Gilbert is hunting
 399 Thread-3  (live) Chick Gladys is digesting
 402 Thread-10 (live) Chick Thomas is digesting
 402 Thread-19 (live) Parent Duane is taking a coffee
 402 Thread-6  (live) Chick Cheryl is digesting
 402 Thread-19 (live) Parent Duane is hunting
 411 Thread-15 (live) Chick Christine is digesting

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#########################..... 4663 lines skipped ......###########################
#######

 13009 Thread-18 (live) Parent Gilbert is taking a coffee
 13009 Thread-18 (live) Parent Gilbert is hunting
 13014 Thread-16 (live) Chick Dale is filling his plate
 13016 Thread-15 (live) Chick Christine is sleeping
 13017 Thread-13 (live) Chick Jose is digesting
 13020 Thread-8  (live) Chick Kathy is filling his plate
 13026 Thread-12 (live) Chick Audrey is ready to take the plunge
 13027 Thread-9  (live) Chick Robert is digesting
 13035 Thread-1  (live) Chick Michael is filling his plate
 13040 Thread-10 (live) Chick Thomas is sleeping
 13043 Thread-5  (live) Chick Laura is sleeping
 13044 Thread-13 (live) Chick Jose is ready to take the plunge
 13044 Thread-18 (live) Parent Gilbert is throwing up 1 worm
 13044 Thread-2  (live) Chick Crystal is eating
 13054 Thread-15 (live) Chick Christine is filling his plate
 13056 Thread-2  (live) Chick Crystal is digesting
 13066 Thread-5  (live) Chick Laura is filling his plate
 13069 Thread-9  (live) Chick Robert is sleeping
 13078 Thread-19 (live) Parent Duane is taking a coffee
 13078 Thread-19 (live) Parent Duane is hunting
 13078 Thread-18 (live) Parent Gilbert is taking a coffee
 13078 Thread-18 (live) Parent Gilbert is hunting
 13083 Thread-9  (live) Chick Robert is filling his plate
 13088 Thread-10 (live) Chick Thomas is filling his plate
 13104 Thread-2  (live) Chick Crystal is ready to take the plunge
 13120 Thread-18 (live) Parent Gilbert is throwing up 5 worm
 13120 Thread-4  (live) Chick Melissa is eating
 13120 Thread-11 (live) Chick Darcy is eating
 13120 Thread-16 (live) Chick Dale is eating
```
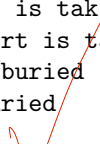
```
13120 Thread-8 (live) Chick Kathy is eating
13120 Thread-3 (live) Chick Gladys is eating
13139 Thread-18 (live) Parent Gilbert is taking a coffee
13139 Thread-18 (live) Parent Gilbert is hunting
13141 Thread-16 (live) Chick Dale is digesting
13141 Thread-4 (live) Chick Melissa is digesting
13150 Thread-3 (live) Chick Gladys is digesting
13150 Thread-8 (live) Chick Kathy is digesting
13155 Thread-16 (live) Chick Dale is sleeping
13164 Thread-11 (live) Chick Darcy is digesting
13166 Thread-19 (live) Parent Duane is taking a coffee
13166 Thread-19 (live) Parent Duane is hunting
13170 Thread-4 (live) Chick Melissa is ready to take the plunge
13187 Thread-19 (live) Parent Duane is throwing up 1 worm
13187 Thread-1 (live) Chick Michael is eating
13188 Thread-11 (live) Chick Darcy is ready to take the plunge
13195 Thread-8 (live) Chick Kathy is sleeping
13195 Thread-18 (live) Parent Gilbert is taking a coffee
13195 Thread-3 (live) Chick Gladys is sleeping
13195 Thread-18 (live) Parent Gilbert is hunting
13204 Thread-16 (live) Chick Dale is filling his plate
13207 Thread-8 (live) Chick Kathy is filling his plate
13233 Thread-19 (live) Parent Duane is taking a coffee
13234 Thread-19 (live) Parent Duane is hunting
13240 Thread-18 (live) Parent Gilbert is throwing up 7 worm
13240 Thread-1 (live) Chick Michael is digesting
13241 Thread-3 (live) Chick Gladys is filling his plate
13241 Thread-15 (live) Chick Christine is eating
13241 Thread-5 (live) Chick Laura is eating
13241 Thread-9 (live) Chick Robert is eating
13241 Thread-16 (live) Chick Dale is eating
13241 Thread-10 (live) Chick Thomas is eating
13241 Thread-8 (live) Chick Kathy is eating
13241 Thread-3 (live) Chick Gladys is eating
13266 Thread-19 (live) Parent Duane is taking a coffee
13266 Thread-3 (live) Chick Gladys is digesting
13267 Thread-19 (live) Parent Duane is hunting
13267 Thread-1 (live) Chick Michael is sleeping
13268 Thread-10 (live) Chick Thomas is digesting
13268 Thread-8 (live) Chick Kathy is digesting
13270 Thread-16 (live) Chick Dale is digesting
13277 Thread-9 (live) Chick Robert is digesting
13278 Thread-15 (live) Chick Christine is digesting
13278 Thread-18 (live) Parent Gilbert is taking a coffee
13279 Thread-18 (live) Parent Gilbert is hunting
13280 Thread-8 (live) Chick Kathy is sleeping
13283 Thread-5 (live) Chick Laura is digesting
13288 Thread-19 (live) Parent Duane is throwing up 7 worm
13288 Thread-15 (live) Chick Christine is ready to take the plunge
13300 Thread-16 (live) Chick Dale is sleeping
13300 Thread-3 (live) Chick Gladys is sleeping
13310 Thread-1 (live) Chick Michael is filling his plate
13310 Thread-1 (live) Chick Michael is eating
13311 Thread-19 (live) Parent Duane is taking a coffee
13311 Thread-19 (live) Parent Duane is hunting
13316 Thread-10 (live) Chick Thomas is sleeping
13316 Thread-3 (live) Chick Gladys is filling his plate
13316 Thread-3 (live) Chick Gladys is eating
13322 Thread-9 (live) Chick Robert is sleeping
```

```
13324 Thread-5 (live) Chick Laura is sleeping
13332 Thread-3 (live) Chick Gladys is digesting
13333 Thread-8 (live) Chick Kathy is filling his plate
13334 Thread-8 (live) Chick Kathy is eating
13341 Thread-1 (live) Chick Michael is digesting
13343 Thread-16 (live) Chick Dale is filling his plate
13343 Thread-16 (live) Chick Dale is eating
13345 Thread-10 (live) Chick Thomas is filling his plate
13345 Thread-10 (live) Chick Thomas is eating
13354 Thread-3 (live) Chick Gladys is ready to take the plunge
13354 Thread-9 (live) Chick Robert is filling his plate
13355 Thread-9 (live) Chick Robert is eating
13355 Thread-1 (live) Chick Michael is sleeping
13360 Thread-8 (live) Chick Kathy is digesting
13366 Thread-5 (live) Chick Laura is filling his plate
13366 Thread-5 (live) Chick Laura is eating
13367 Thread-18 (live) Parent Gilbert is throwing up 3 worm
13374 Thread-1 (live) Chick Michael is filling his plate
13375 Thread-1 (live) Chick Michael is eating
13377 Thread-16 (live) Chick Dale is digesting
13386 Thread-10 (live) Chick Thomas is digesting
13387 Thread-8 (live) Chick Kathy is sleeping
13387 Thread-9 (live) Chick Robert is digesting
13394 Thread-18 (live) Parent Gilbert is taking a coffee
13394 Thread-18 (live) Parent Gilbert is hunting
13399 Thread-5 (live) Chick Laura is digesting
13401 Thread-10 (live) Chick Thomas is sleeping
13408 Thread-9 (live) Chick Robert is sleeping
13416 Thread-1 (live) Chick Michael is digesting
13429 Thread-16 (live) Chick Dale is ready to take the plunge
13433 Thread-8 (live) Chick Kathy is filling his plate
13433 Thread-8 (live) Chick Kathy is eating
13441 Thread-5 (live) Chick Laura is sleeping
13448 Thread-9 (live) Chick Robert is filling his plate
13448 Thread-10 (live) Chick Thomas is filling his plate
13448 Thread-9 (live) Chick Robert is eating
13448 Thread-19 (live) Parent Duane is throwing up 3 worm
13449 Thread-10 (live) Chick Thomas is eating
13455 Thread-1 (live) Chick Michael is ready to take the plunge
13461 Thread-8 (live) Chick Kathy is digesting
13461 Thread-19 (live) Parent Duane is taking a coffee
13461 Thread-10 (live) Chick Thomas is digesting
13462 Thread-19 (live) Parent Duane is hunting
13473 Thread-10 (live) Chick Thomas is sleeping
13482 Thread-5 (live) Chick Laura is filling his plate
13482 Thread-5 (live) Chick Laura is eating
13489 Thread-9 (live) Chick Robert is digesting
13489 Thread-8 (live) Chick Kathy is sleeping
13505 Thread-19 (live) Parent Duane is taking a coffee
13506 Thread-10 (live) Chick Thomas is filling his plate
13506 Thread-19 (live) Parent Duane is hunting
13506 Thread-10 (live) Chick Thomas is eating
13506 Thread-18 (live) Parent Gilbert is throwing up 2 worm
13509 Thread-8 (live) Chick Kathy is filling his plate
13510 Thread-8 (live) Chick Kathy is eating
13522 Thread-9 (live) Chick Robert is ready to take the plunge
13528 Thread-5 (live) Chick Laura is digesting
13537 Thread-18 (live) Parent Gilbert is taking a coffee
13537 Thread-18 (live) Parent Gilbert is hunting
```

```
13538 Thread-10 (live) Chick Thomas is digesting
13538 Thread-8 (live) Chick Kathy is digesting
13543 Thread-5 (live) Chick Laura is sleeping
13562 Thread-8 (live) Chick Kathy is sleeping
13576 Thread-10 (live) Chick Thomas is ready to take the plunge
13576 Thread-8 (live) Chick Kathy is filling his plate
13576 Thread-8 (live) Chick Kathy is eating
13576 Thread-19 (live) Parent Duane is throwing up 1 worm
13583 Thread-5 (live) Chick Laura is filling his plate
13584 Thread-5 (live) Chick Laura is eating
13584 Thread-18 (live) Parent Gilbert is throwing up 4 worm
13607 Thread-19 (live) Parent Duane is taking a coffee
13607 Thread-19 (live) Parent Duane is hunting
13608 Thread-5 (live) Chick Laura is digesting
13610 Thread-18 (live) Parent Gilbert is taking a coffee
13610 Thread-18 (live) Parent Gilbert is hunting
13634 Thread-8 (live) Chick Kathy is digesting
13641 Thread-5 (live) Chick Laura is ready to take the plunge
13651 Thread-19 (live) Parent Duane is taking a coffee
13651 Thread-19 (live) Parent Duane is hunting
13655 Thread-8 (live) Chick Kathy is sleeping
13693 Thread-18 (live) Parent Gilbert is taking a coffee
13693 Thread-18 (live) Parent Gilbert is hunting
13709 Thread-8 (live) Chick Kathy is filling his plate
13710 Thread-8 (live) Chick Kathy is eating
13759 Thread-8 (live) Chick Kathy is digesting
13808 Thread-8 (live) Chick Kathy is ready to take the plunge
13808 MainThread Parent Gilbert is dying of sorrow
13808 MainThread Parent Duane is dying of sorrow
13809 MainThread Chick Michael is buried
13809 MainThread Chick Crystal is buried
13809 MainThread Chick Gladys is buried
13809 MainThread Chick Melissa is buried
13809 MainThread Chick Laura is buried
13809 MainThread Chick Cheryl is buried
13809 MainThread Chick Johnny is buried
13809 Thread-18 (live) Parent Gilbert is throwing up 1 worm
13809 Thread-19 (live) Parent Duane is throwing up 6 worm
13809 MainThread Chick Kathy is buried
13810 MainThread Chick Robert is buried
13810 MainThread Chick Thomas is buried
13810 MainThread Chick Darcy is buried
13810 MainThread Chick Audrey is buried
13810 MainThread Chick Jose is buried
13810 MainThread Chick Helen is buried
13810 MainThread Chick Christine is buried
13810 MainThread Chick Dale is buried
13810 MainThread Chick Robert is buried
13833 Thread-19 (live) Parent Duane is taking a coffee
13845 Thread-18 (live) Parent Gilbert is taking a coffee
13845 MainThread Parent Gilbert is buried
13845 MainThread Parent Duane is buried
Lab02 - finish simulation
```

Lab02 - The baby bird problem

This is the third TP of the lesson "Concurrent system". In this exercise we need to use semaphores to protect critical section and synchronize threads. The guideline is available here.

This project is made by @Simon.barras

Launch app

```
python3 babybird.py [chicks [baby_iter [max_food_size [hunting_success_rate]]]]
```

argument	description	range	default
baby-bird.py	name of the python program file that contains the main entry point		
chicks	the number of chick processes	1	17
baby_iter	the number of iterations a baby chick does before it reaches adulthood and leaves the nest	1	53
max_food_size	the maximum portion size a parent brings back from a hunt. This is at the same time also the maximum capacity a nest can contain (C)	1	7
hunting_success_rate	represents the success rate a parent has when hunting. A rate of (for example) 25% means that quarter the time, a parent returns with some food. There is no percent sign after this number	0 rate 100	50

Babybird

The code is commented but I want to explain my his structure.
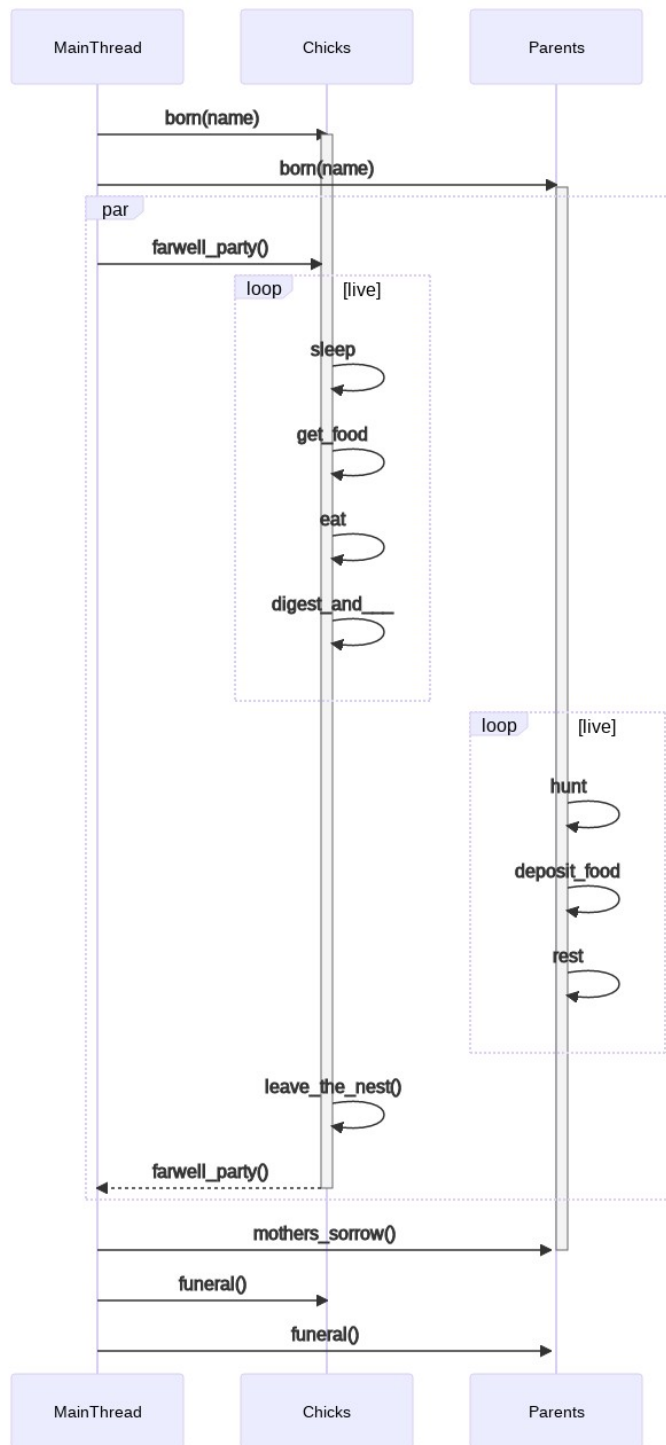
Architecture

For realising this Lab, I'have use *classes*, it's allows to code with object. I'have created 2 objects: *Chick* & *Parent*.

This object use *Thread* to run the routine of the parents or the chicks.

MainThread

int WAIT_BIRD
int WAIT_MAX
int NB_OF_PARENTS
int DEFAULT_NB_CHICKS
int DEFAULT_BABY_ITR
int DEFAULT_FOOD_CAPACITY
int DEFAULT_HUNTING_RATE
int g_nb_day_to_be_a_chicken
int g_nb_of_worm
int g_food_capacity
int g_hunting_success_rate
Semaphore sem_wait_eat
Sempahore lock_worm_tank
Sempahore lock_tank_fill

---

building_nest(chicks, baby_itr, food_capacity, hunting_success_rate)
nap(bird_speed: int)
simulating()
destroy_nest()
main(args)
parse_arg(argv)
check_arg(i, arg)

Array g_parents   Array g_chicks

Parent

str name
Thread spirit
float speed
bool has_child
int hunting_result

__init__()
born(name: str)
thread's worker -> live()
hunt()
deposit_food()
rest()
mothers_sorrow()
funeral()

Chick

str name
Thread spirit
float speed
Semaphore live

__init__()
born(name: str)
thread's worker -> live()
sleep()
get_food()
eat()
digest_and____()
leave_the_nest()
farewell_party()
funeral()

Made with Mermaid

The *MainThread* use the different classes to run this application. Each bird is simulating by an instance of one of those two classes and they are living her life until they finish.
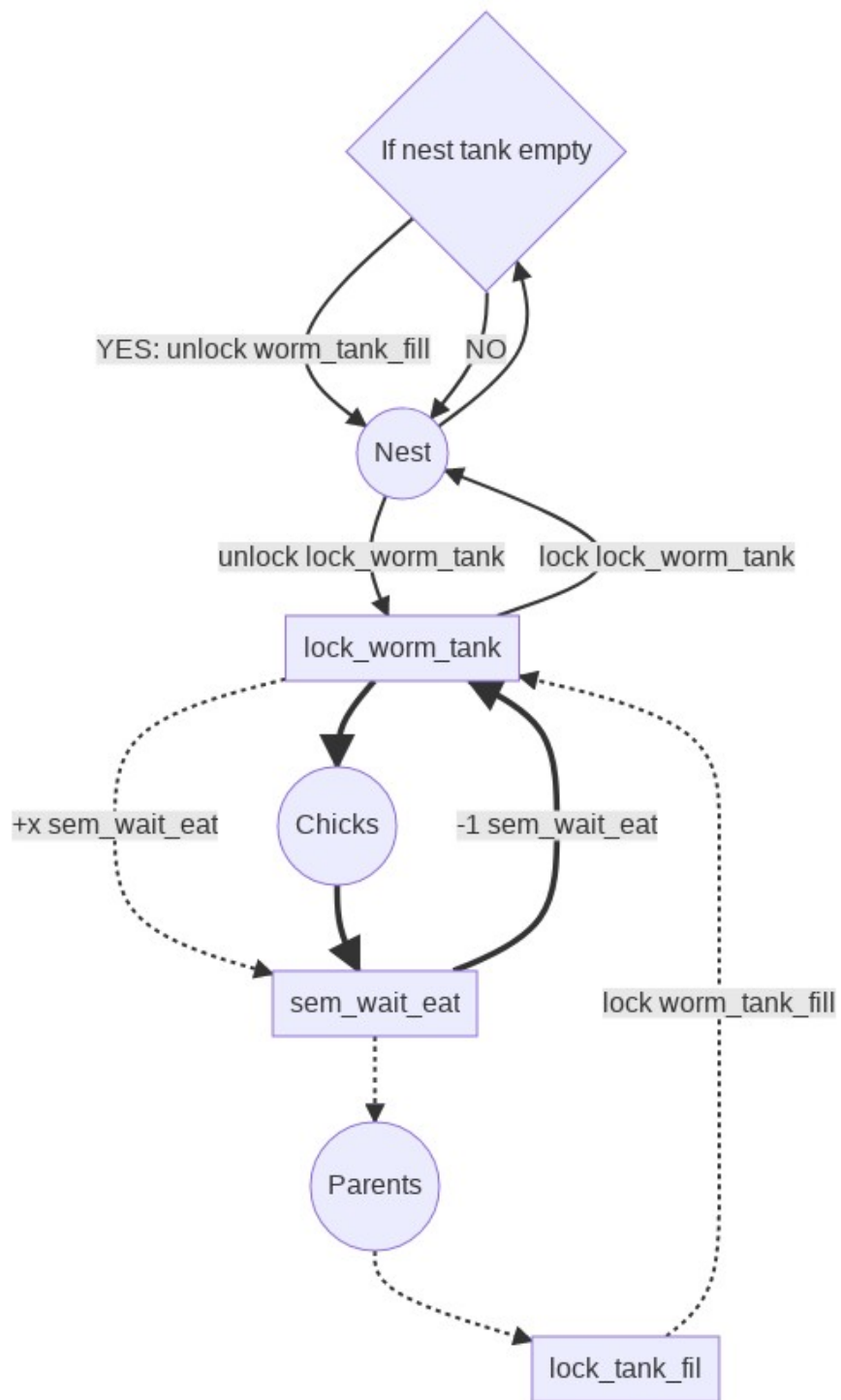
Made with Mermaid

For the *Chicks*, they release their semaphore with *leave_the_nest()*. When all semaphores are released, the *MainThread* free the parents with *mothers_sorrow()*. The threads are closed with *funeral()*.

Sempahores

For this project, we use 3 semaphores plus one sempahore for each chick. Here, I want to explain the flow of the 3 main semaphores.

Made with Mermaid

Lines	Description
dotted	parent's flow
bold	chick's flow
regular	both

Case	description
Circle	ressource
rectangle	semaphore
losange	condition

This graph show the process and we can imagine how the threads are synchronised together. The threads are waiting on checkpoint (semaphore) until the others threads release them.

We can see that, the two semaphores with lock_… are switches. They can be only On/Off. It's allow to accept only one thread at a time. On the contrary, the semaphore *sem_wait_eat* is a counter of the number of worms in the tank. When a prent fill the tank, he release the semaphore the number of worm he found and every chick aquire the semaphore one time when he eat.

This graph didn't show the semaphores of the chicks. To finish the simulation, I used a sempahore for each chick. When the mainThread have realeased all the chick's semaphore, he notify the parent thread and bury all the birds.

The activity is show with a graph in the result.

Test

I have write some tests to evaluate my program with different critical values.

test_not_int

Try to put non insteger values. Every attempt must failed.

test_negative

This test try to put negative values. Every attempt must failed.

test_out_of_bound

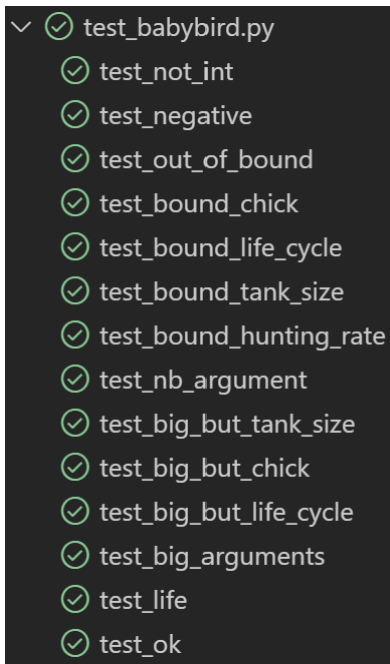Try to put values that aren't in the range for each arguments. Every attempt must failed.

Figure 1: Test result

test_bound_XXX

Use some values that can be critic. This values are near 1 or the customs bounds.

test_nb_argument

Try to run the files with different number of arguments.

test_big_but_tank_size

This test run the programm with big arguments aside for the tank size.

test_big_but_chick

This test run the programm with big arguments aside for the number of chicks.

test_big_but_life_cycle

This test run the programm with big arguments aside for the life cycle.

test_big_arguments

This test run the programm with big arguments.

test_ok

Run the file with legal arguments. Store the result in a log file. This file is use to create a graph that represent the activity of the nest.

run_infinity

This test isn't run with *pytest* because he is never stopping. I have run this by my own and I have analyzed the result in live. The chick are waiting to take food and the parent are living their life in an infinite loop.

Result

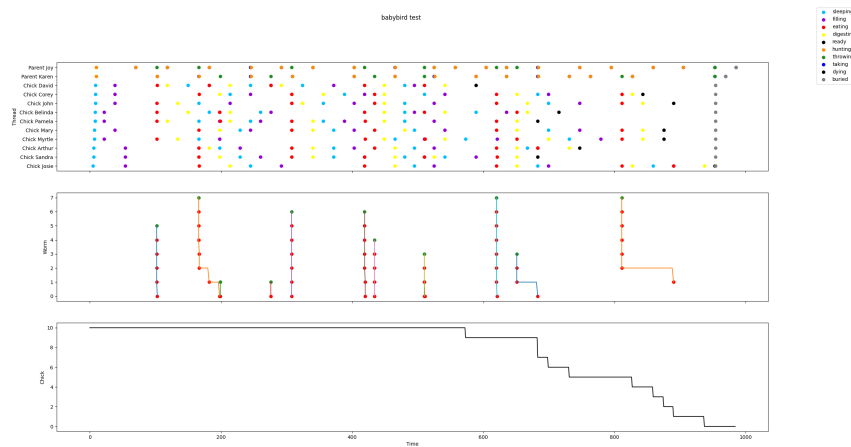I have write a little script that represent the activity of the nest like a profiler.

Figure 2: Result

I have made this graph with matplotlib

Color	Description
Cyan	Chick sleep (wait)
Purple	Chick get one food (try to access to the ressource)
Red	Chick eat the food (wait)
Yellow	Chick digest (wait)
Black	Chick leave the nest (release his sempahore) / Parent are notify they are no more chick in the nest (stop his routine)
Orange	Parent hunt (wait and random value)
Green	Parent try to put some food in the nest (try to access to the ressources)

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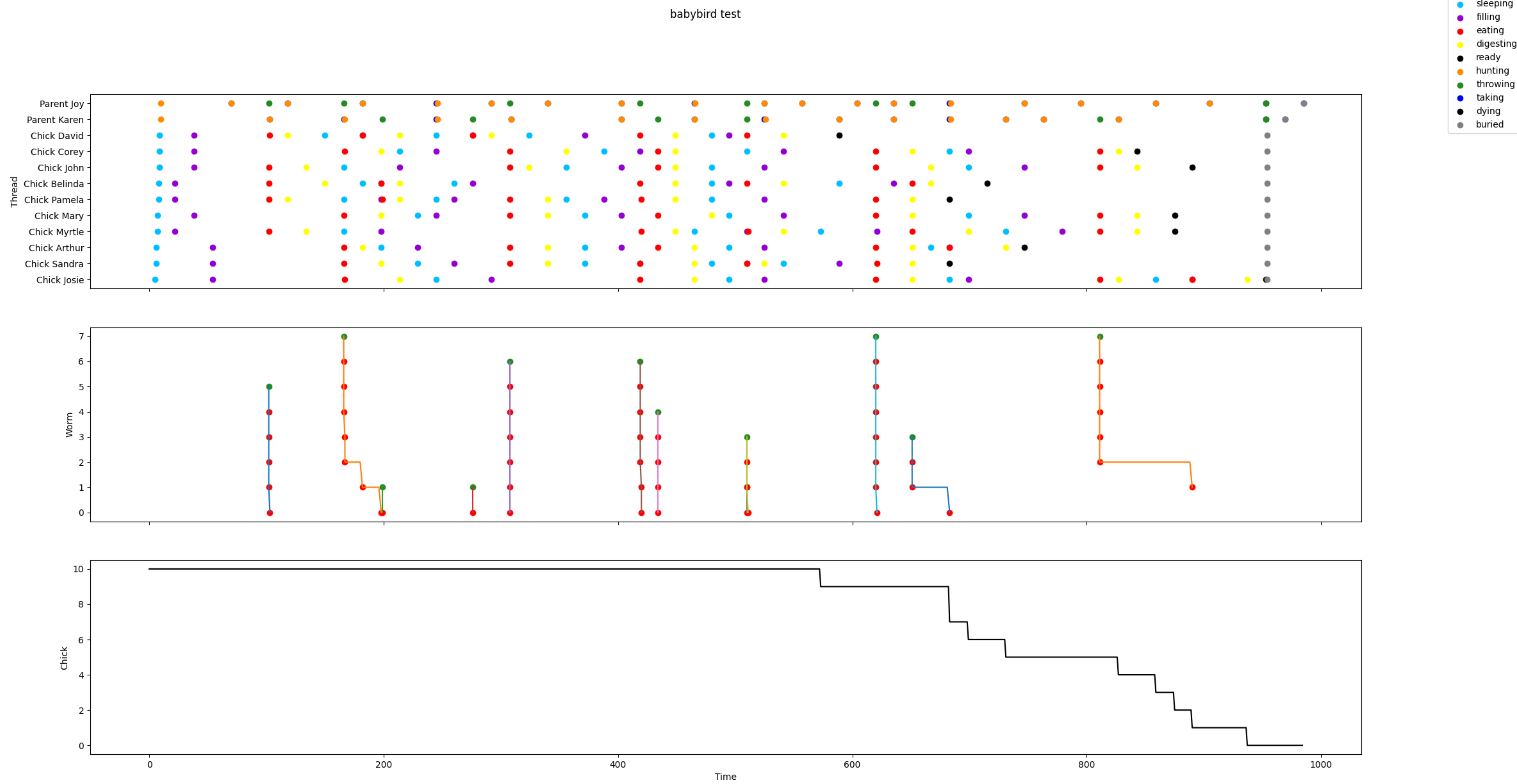| Color	Description
Blue	Parents take a pause (wait)
Grey	Finish the simulation (Parent and chikc's thread are joining)

This graph is difficult to read but it show all the different activity of the nest. Each color's dot represents an action. The previous tab give some indications on what the methods is doing. Whene there is a *"(wait)"*, the method is just a timer. In the middle, we can see the evolution of the worm's tank. Every time a parent fill this tank, all the chick wich are waiting on food are eating instantly. Near time 200, we can see that a parent was waiting on the chick to fill the tank. The last graph display the number of chick in the nest. We can see that when the line rach 0, all the chick are buried (the chick thread are join) and the parent are finishing their routine before they are buried too.

Conclusion

That was a very interesting lab. I was very happy to work on a little simulation like this and I think it's a great idea to learn sempahore with this problem. Personaly, I think I have understand semaphore well and I have also train the object orientation in python and my personal opinion is: Pyhton is a great language for all kind of prototypes and it work well with little project but I never recommend to a big application that use a lot of classes.

The nest update can be to use less semaphore for the ending the simulation. I can use only one semaphore and try to acquire the number of chick in the nest. All the chick will release this semaphore when they are leaving the nest. This new solution implemented in the branch *chicksSemaphore*.

babybird test

- ✓ test_babybird.py
  - ✓ test_not_int
  - ✓ test_negative
  - ✓ test_out_of_bound
  - ✓ test_bound_chick
  - ✓ test_bound_life_cycle
  - ✓ test_bound_tank_size
  - ✓ test_bound_hunting_rate
  - ✓ test_nb_argument
  - ✓ test_big_but_tank_size
  - ✓ test_big_but_chick
  - ✓ test_big_but_life_cycle
  - ✓ test_big_arguments
  - ✓ test_life
  - ✓ test_ok