```
Script started on 2022-12-08 14:52:30-06:00 [TERM="xterm" TTY="/dev/pts/8" COLUMNS=
j pec2@ares:~/JPMainDir/CSC122/Port3/animallab$ pwd
/home/students/j pec2/JPMainDir/CSC122/Port3/animallab
j pec2@ares:~/JPMainDir/CSC122/Port3/animallab$ cat Animalnfo.txt
Jack Pec
CSC122-001
Animal Lab
Overall level 4
Desc:
It's the "Survial of the fittest?"
labj pec2@ares:~/JPMainDir/CSC122/Port3/animallab$ show-code AnimalLabDriverV2.cpp
AnimalLabDriverV2.cpp:
    1 #include <iostream>
     2 #include <string>
     3 #include <vector>
     4 #include "randVal.h"
       #include "animalV2.h"
     7
        using namespace std;
    8
    9
       int main(void)
   10
   11
            vector<prey> preylist;
    12
            vector<predator> predatorlist:
    13
    14
    15
            string preyName;
    16
            string predatorName:
    17
    18
            long preyPop;
            long predPop;
    19
    20
    21
            long speedLower;
    22
            long speedUpper;
    23
    24
            long foodUpper;
    25
            long foodLower;
    26
            long birthUpperPrey;
    27
    28
            long birthLowerPrey;
    29
    30
            long deathUpperPrey;
```

```
31
         long deathLowerPrey;
32
33
         long birthUpperPred;
34
         long birthLowerPred:
35
36
         long deathUpperPred;
37
         long deathLowerPred;
38
39
         long hungerUpper;
40
         long hungerLower;
41
42
         long numOfPredEats:
43
44
         size t gen;
45
46
         cout << "Enter prey name: ";</pre>
47
         cin >> preyName;
48
49
         cout << "Enter predator name: ";</pre>
50
         cin >> predatorName;
51
         cout << "Enter Prey population: ";</pre>
52
53
         cin >> preyPop;
54
55
         cout << "Enter Predator population: ";</pre>
56
         cin >> predPop;
57
58
59
         cout << "Enter how many generations: ";</pre>
60
         cin >> den:
61
         cout << "Enter lower bound for speed: ";</pre>
62
63
         cin >> speedLower:
         cout << "Enter Upper bound for speed: ";</pre>
64
65
         cin >> speedUpper;
66
         cout << "Enter lower bound for food: ";</pre>
         cin >> foodLower:
67
68
         cout << "Enter Upper bound for food: ";</pre>
69
         cin >> foodUpper;
70
71
72
         cout << "\nFor Prey\n";</pre>
73
         cout << "Enter lower bound for birthrate: ";</pre>
74
         cin >> birthLowerPrey;
75
         cout << "Enter Upper bound for birthrate: ";</pre>
         cin >> birthUpperPrey;
76
77
78
         cout << "Enter lower bound for death rate: ":</pre>
         cin >> deathLowerPrev:
79
80
         cout << "Enter Upper bound for death rate: ":</pre>
81
         cin >> deathUpperPrev:
82
83
         cout << "\nFor Predators\n";</pre>
         cout << "Enter lower bound for birthrate: ";</pre>
84
```

```
85
         cin >> birthLowerPred;
 86
         cout << "Enter Upper bound for birthrate: ":</pre>
 87
         cin >> birthUpperPred;
 88
 89
         cout << "Enter lower bound for death rate: ":</pre>
         cin >> deathLowerPred:
 90
 91
         cout << "Enter Upper bound for death rate: ";</pre>
         cin >> deathUpperPred;
 92
 93
 94
 95
         //when pred hunger becomes < 0, they stop eating
 96
         cout << "Enter lower bound for hunger for predators: ":</pre>
 97
         cin >> hungerLower:
         cout << "Enter Upper bound for hunger for predators: ":</pre>
 98
 99
         cin >> hungerUpper;
100
         cout << "Enter Upper bound how many predators could eat prey: ";</pre>
101
         cin >> numOfPredEats;
102
103
104
         //sets up beginning pops
105
         for(size t i = 0; i < static cast<size t>(preyPop); i++)
106
107
             prey temp1(preyName,
108
                         rand range(static cast<long>(speedLower),
                                     static cast<long>(speedUpper)),
109
110
                         rand range(static cast<long>(foodLower),
                                    static cast<long>(foodUpper)));
111
112
             preylist.push back(temp1);
113
114
115
         }
116
117
         for(size t i = 0; i < static cast<size t>(predPop); i++)
118
         {
119
             long predHunger = rand range(hungerLower,hungerUpper);
120
121
             long predSpeed = rand range(speedLower, speedUpper);
122
123
             predator temp2(predatorName,
124
                             predSpeed,
125
                             predHunger):
126
127
             predatorlist.push back(temp2);
128
129
         }
130
131
132
133
134
135
136
137
         std::cout << "Initial Predator Pop: " << predatorlist.size() << "\n";</pre>
         std::cout << "Initial Prey Pop: " << preylist.size() << "\n";</pre>
138
```

```
139
140
141
142
         // main do loop
143
         do
144
         {
145
146
147
             for(size t i = 0; i < static cast<size t>(
148
                          rand range(1, numOfPredEats)); i++ )
149
150
151
                 if(predatorlist.size() > 0 && preylist.size() > 0)
152
153
                     //get's a random index in prev list
154
                     size t k = static cast<size t>(
155
                                     rand range (0,
                                     static cast<long>(prevlist.size()-1)));
156
157
158
                     //get's a random index in predator list
                     size t p = static cast<size t>(
159
160
                                     rand range (0,
161
                                     static cast<long>(predatorlist.size()-1)));
162
163
164
                     // predator will only attempt to eat if they
                     //still have hunger
165
166
                     //and if true..
167
                     if(predatorlist[p].eat(prevlist[k]))
168
169
                          preylist.erase(preylist.begin() + k);
170
171
172
173
174
                     //hunger reset
175
176
177
                     for(size t b = 0; b < predatorlist.size(); b++ )</pre>
178
179
                          predatorlist[b].resetHunger();
180
                          //reset to hunger they had
181
                         //when formed in list
182
183
                     }
184
                 }
185
186
             }
187
188
189
             //deathrate
190
191
             //prey
192
             for(size t i = 0; i < static cast<size t>(
```

```
193
                         rand range(deathLowerPrey, deathUpperPrey)); i++ )
194
195
196
                 if(preylist.size() > 0)
197
198
                     preylist.pop back();
199
                 }
200
201
202
             //pred
203
             for(size t i = 0; i < static cast<size t>(
204
                         rand range(deathLowerPred, deathUpperPred)): i++ )
205
206
207
                 if(predatorlist.size() > 0)
208
209
                     predatorlist.pop back();
210
                 }
211
212
213
214
             //birthrate
215
216
             //prev
217
             for(size t i = 0; i < static cast<size t>(
218
                         rand range(birthLowerPrey, birthUpperPrey)); i++)
219
220
                 //long predandpreyBirth = rand range(birthLower,birthUpper);
221
222
223
                 //long predHunger = rand range(hungerLower,hungerUpper);
224
225
                 //long predSpeed = rand range(speedLower, speedUpper);
226
227
                 prey temp1(preyName,rand range(static cast<long>(speedLower),
                                                 static cast<long>(speedUpper)),
228
229
                            rand range(static cast<long>(foodLower),
230
                                        static cast<long>(foodUpper)));
231
232
                 preylist.push back(temp1);
233
234
             }
235
236
             //pred
237
             for(size t i = 0; i < static cast<size t>(
                         rand range(birthLowerPred, birthUpperPred)); i++ )
238
239
                 long predSpeed = rand range(speedLower.speedUpper);
240
241
242
                 long predHunger = rand range(hungerLower,hungerUpper);
243
244
                 predator temp2(predatorName,
245
                                predSpeed,
246
                                predHunger);
```

```
247
   248
                    predatorlist.push back(temp2);
   249
   250
   251
                }
   252
   253
   254
   255
                std::cout << "Number of predators left: "</pre>
   256
                           << predatorlist.size() << "\n";
   257
   258
                std::cout << "Number of prev left: " << prevlist.size() << "\n":</pre>
   259
   260
   261
                --gen;
   262
   263
            while(!predatorlist.empty() && !preylist.empty() && gen != 0);
   264
   265
            return 0;
   266 }
i pec2@ares:~/JPMainDir/CSC122/Port3/animallab$ ls
AnimalLabDriverV2.cpp AnimalTPQ.txt randVal.h
Animalnfo.txt
                       animalV2.h
                                       typescript
i pec2@ares:~/JPMainDir/CSC122/Port3/animallab$ show-code animalV2.h
animalV2.h:
     1
     3
        Animal Lib
     5
     6
     7
        #pragma once
     8
    9
        #include <string>
    10
    11
    12
    13 class baseAnimal
    14
    15
            // int food;
    16
            std::string name = "empty";
    17
            long speed;
    18
            // long birthrate;
    19
    20
    21
    22
            baseAnimal(std::string nameIn. long speedIn = 0)
    23
    24
                name(nameIn),
    25
                speed(speedIn)
```

```
26
            // birthrate(val2)
27
28
29
            // cerr << "base created: " << this << '\n';</pre>
30
        baseAnimal(const baseAnimal & b)
31
32
            name(b.name),
33
34
            speed(b.speed)
35
36
            // cerr << "base (copy) created: " << this << '\n';</pre>
37
38
        virtual ~baseAnimal(void)
39
            // cerr << "base destroyed (" << this << ")\n";</pre>
40
41
42
43
        baseAnimal & operator=(const baseAnimal & c) = default;
44
45
46
        //getters and setters
47
        long get speed(void) const
48
49
50
            return speed;
51
        }
52
53
        bool set speed(long val)
54
55
            bool okay = false;
56
57
            if(val >=0 ) //hardcoded
58
59
                speed = val;
60
                okay = true;
61
62
63
            return okay;
64
        }
65
66
67
        std::string get name(void) const
68
        {
69
70
            return name;
71
72
73
        void set name(std::string nameIN)
74
75
            name = nameIN:
76
77
78
79
```

```
80
 81
 82
 83
 84
 85
 86
 87
    class prey : public baseAnimal
 88
 89
         long food;
 90
 91
 92
     public:
 93
         prey(std::string nameIn,long speedIn = 0,long foodIn = 0)
 94
 95
             baseAnimal(nameIn,speedIn),
 96
             food(foodIn)
 97
 98
         {
 99
             // cerr << "prey created: " << this << '\n';</pre>
100
101
         prey(const prey & b)
102
103
             baseAnimal(b).
104
             food(b.food)
105
         {
106
             // cerr << "prey (copy) created: " << this << '\n';</pre>
107
108
         virtual ~prev(void)
109
110
                 cerr << "prey destroyed (" << this << ")\n";</pre>
111
112
113
         prey & operator=(const prey & c) = default;
114
115
         //getters and setters
116
117
         long get food(void) const
118
119
120
             return food:
121
         }
122
123
         bool set food(long val)
124
125
             bool okay = false;
126
127
             if(val >=0 ) //hardcoded
128
129
                 food = val:
130
                 okay = true;
131
132
133
             return okay;
```

```
134
         }
135
136
137
138
139 };
140
141 class predator : public baseAnimal
142 {
143
         long maxHunger;
144
         long hunger;
145
146
147
     public:
         predator(std::string nameIn, long speedIn = 0,long hungerIn = 0)
148
149
             baseAnimal(nameIn,speedIn),
150
151
             maxHunger(hungerIn),
             hunger(hungerIn)
152
153
154
155
156
             // cerr << "predator created: " << this << '\n';</pre>
157
158
         predator(const predator & b)
159
160
             baseAnimal(b),
161
             maxHunger(b.maxHunger),
             hunger(b.hunger)
162
163
164
             // cerr << "predator (copy) created: " << this << '\n';</pre>
165
166
167
         virtual ~predator(void)
168
             // cerr << "predator destroyed (" << this << ")\n";</pre>
169
170
171
         predator & operator=(const predator & c) = default;
172
173
174
         //getters and setters
175
         long get hunger(void) const
176
         {
177
178
             return hunger;
179
180
181
         bool set hunger(long val)
182
183
             bool okay = false;
184
185
             if(val >=0 ) //hardcoded
186
187
                 hunger = val;
```

```
188
                    okay = true;
   189
   190
   191
                return okay;
   192
            }
   193
   194
   195
            void resetHunger()
   196
            {
   197
                hunger = maxHunger;
   198
   199
   200
            //stops being called when hunger is less than or equal to 0
   201
            bool eat(prey & p)
   202
   203
                bool returnVal = false;
   204
   205
                if(baseAnimal::get speed() > p.baseAnimal::get speed()
   206
                        && hunger > 0)
   207
   208
                    hunger -= p.get food():
   209
                    returnVal = true;
   210
   211
                }
   212
   213
                return returnVal;
   214
   215
            }
   216
   217
   218
   219 };
j pec2@ares:~/JPMainDir/CSC122/Port3/animallab$ ls
AnimalLabDriverV2.cpp AnimalTPQ.txt randVal.h
Animalnfo.txt
                       animalV2.h
                                      typescript
j pec2@ares:~/JPMainDir/CSC122/Port3/animallab$ show-code randVal.h
randVal.h:
     1 /*
     2
     3 Random Lib
     5
     6
        #pragma once
       #include <iostream>
       //#include
       //#include <string>
    10
    11
    12 //Random whole Nums
    13 inline long rand range(long min, long max)
```

```
14 {
    15
            return rand()/(RAND MAX / (max-min+1) + 1) + min;
    16 }
    17
    18 //Random Decimal Numbers
    19 inline double rand 01(void)
    20 {
   21
           //This gives a warning
    22
    23
    24
           warning: conversion
    25
           from long int to double may
    26
            change value [-Wconversion]
    27
            21 | return rand range(OL.
    28
           RAND MAX-1L)/(RAND MAX-1.0);
    29
           Don't know how to fix it
    30
    31
    32
    33
            return static cast<double>(rand range(OL, RAND MAX-1L))
    34
                  /(static cast<double>(RAND MAX)-1.0):
    35 }
    36
    37 inline double rand range(double min, double max)
    38 {
    39
            return rand 01() * (max-min) + min;
    40 }
    41
    42 //Random Char Values
    43 inline char rand range(char min, char max)
    44 {
    45
            return static cast<char>(rand range(static cast<long>(min),
    46
                                                static cast<long>(max))):
    47 }
    48
    49 //Random Action Occurence
       // probability is expected to be a standard [0, 1] value
    51 inline bool event occurred(double probability)
    53
            return rand 01() <= probability;</pre>
    54 }
    55
    56 inline bool flip coin(double chance heads = 0.5) // fair coin
    57 {
    58
            return event occurred(chance heads);
j pec2@ares:~/JPMainDir/CSC122/Port3/animallab$ lss
AnimalLabDriverV2.cpp AnimalTPQ.txt randVal.h
Animalnfo.txt
                      animalV2.h
                                     typescript
j pec2@ares:~/JPMainDir/CSC122/Port3/animallab$ CPP AnimalLabDriverV2.cpp animalV2
AnimalLabDriverV2.cpp***
```

```
j pec2@ares:~/JPMainDir/CSC122/Port3/animallab$ ./AnimalLabDriverV2.ou
Enter prev name: Rabbit
Enter predator name: Fox
Enter Prey population: 100
Enter Predator population: 50
Enter how many generations: 100
Enter lower bound for speed: 3
Enter Upper bound for speed: 5
Enter lower bound for food: 3
Enter Upper bound for food: 6
For Prev
Enter lower bound for birthrate: 3
Enter Upper bound for birthrate: 4
Enter lower bound for death rate: 2
Enter Upper bound for death rate: 3
For Predators
Enter lower bound for birthrate: 2
Enter Upper bound for birthrate: 3
Enter lower bound for death rate: 1
Enter Upper bound for death rate: 2
Enter lower bound for hunger for predators: 9
Enter Upper bound for hunger for predators: 12
Enter Upper bound how many predators could eat prey: 10
Initial Predator Pop: 50
Initial Prey Pop: 100
Number of predators left: 51
Number of prey left: 100
Number of predators left: 53
Number of prev left: 102
Number of predators left: 53
Number of prev left: 102
Number of predators left: 55
Number of prey left: 104
Number of predators left: 56
Number of prev left: 105
Number of predators left: 57
Number of prev left: 105
Number of predators left: 57
Number of prev left: 104
Number of predators left: 58
Number of prey left: 105
Number of predators left: 58
Number of prey left: 106
Number of predators left: 58
Number of prey left: 103
Number of predators left: 58
Number of prey left: 101
Number of predators left: 58
Number of prev left: 100
Number of predators left: 58
Number of prey left: 98
Number of predators left: 59
```

Number of prey left: 98	Number of prey left: 103
Number of predators left: 61	Number of predators left: 95
Number of prey left: 100	Number of prey left: 103
Number of predators left: 63	Number of predators left: 96
Number of prey left: 98	Number of prey left: 102
Number of predators left: 65	Number of predators left: 96
Number of prey left: 100	Number of prey left: 103
Number of predators left: 65	Number of predators left: 96
Number of prey left: 102	Number of prey left: 103
Number of predators left: 66	Number of predators left: 96
Number of prey left: 104	Number of prey left: 104
Number of predators left: 68	Number of predators left: 97
Number of prey left: 105	Number of prey left: 104
Number of predators left: 69	Number of predators left: 97
Number of prey left: 106	Number of prey left: 104
Number of predators left: 71	Number of predators left: 98
Number of prey left: 102	Number of prey left: 105
Number of predators left: 72	Number of predators left: 100
Number of prey left: 102	Number of prey left: 106
Number of predators left: 73	Number of predators left: 100
Number of predactis tert. 75 Number of prey left: 103	Number of prey left: 107
Number of predators left: 74	Number of predators left: 102
	•
Number of prey left: 102	Number of prey left: 106
Number of predators left: 75	Number of predators left: 103
Number of prey left: 103	Number of prey left: 107
Number of predators left: 77	Number of predators left: 104
Number of prey left: 102	Number of prey left: 107
Number of predators left: 78	Number of predators left: 106
Number of prey left: 104	Number of prey left: 107
Number of predators left: 80	Number of predators left: 107
Number of prey left: 103	Number of prey left: 107
Number of predators left: 80	Number of predators left: 107
Number of prey left: 102	Number of prey left: 109
Number of predators left: 81	Number of predators left: 108
Number of prey left: 103	Number of prey left: 110
Number of predators left: 83	Number of predators left: 109
Number of prey left: 103	Number of prey left: 110
Number of predators left: 85	Number of predators left: 110
Number of prey left: 102	Number of prey left: 108
Number of predators left: 86	Number of predators left: 110
Number of prey left: 102	Number of prey left: 108
Number of predators left: 87	Number of predators left: 110
Number of prey left: 102	Number of prey left: 109
Number of predators left: 87	Number of predators left: 112
Number of prey left: 101	Number of prey left: 111
Number of predators left: 87	Number of predators left: 114
Number of predactis tert. 67 Number of prey left: 103	Number of prey left: 111
, ,	
Number of predators left: 89	Number of predators left: 114
Number of prey left: 103	Number of prey left: 113
Number of predators left: 91	Number of predators left: 114
Number of prey left: 103	Number of prey left: 115
Number of predators left: 91	Number of predators left: 114
Number of prey left: 103	Number of prey left: 117
Number of predators left: 93	Number of predators left: 115

Number of prey left: 118	Number of prey left: 129
Number of predators left: 117	Number of predators left: 141
· ·	· ·
Number of prey left: 117	Number of prey left: 129
Number of predators left: 119	Number of predators left: 142
Number of prey left: 119	Number of prey left: 127
Number of predators left: 121	Number of predators left: 144
Number of prey left: 119	Number of prey left: 127
Number of predators left: 122	Number of predators left: 144
Number of prey left: 119	Number of prey left: 128
Number of predators left: 123	Number of predators left: 145
Number of prey left: 120	Number of prey left: 130
Number of predators left: 124	<pre>j pec2@ares:~/JPMainDir/CSC122/Port3/animallab\$./AnimalLabDriverV2.out</pre>
Number of prey left: 121	Enter prey name: Rabbit
Number of predators left: 125	Enter predator name: Fox
Number of prey left: 121	Enter Prey population: 1000
Number of predators left: 126	Enter Predator population: 50
Number of prey left: 122	Enter how many generations: 100
Number of predators left: 126	Enter lower bound for speed: 3
Number of prey left: 124	Enter Upper bound for speed: 6
Number of predators left: 127	Enter lower bound for food: 3
Number of predactors tert. 127	Enter Upper bound for food: 4
' *	Effet Opper Bound for 100d. 4
Number of predators left: 127	For Brown
Number of prey left: 125	For Prey
Number of predators left: 128	Enter lower bound for birthrate: 3
Number of prey left: 124	Enter Upper bound for birthrate: 4
Number of predators left: 129	Enter lower bound for death rate: 6
Number of prey left: 124	Enter Upper bound for death rate: 7
Number of predators left: 130	
Number of prey left: 124	For Predators
Number of predators left: 130	Enter lower bound for birthrate: 3
Number of prey left: 124	Enter Upper bound for birthrate: 4
Number of predators left: 130	Enter lower bound for death rate: 1
Number of prey left: 126	Enter Upper bound for death rate: 2
Number of predators left: 130	Enter lower bound for hunger for predators: 10
Number of prey left: 125	Enter Upper bound for hunger for predators: 15
Number of predators left: 130	Enter Upper bound how many predators could eat prey: 20
Number of prey left: 127	Initial Predator Pop: 50
Number of predators left: 130	Initial Prey Pop: 1000
Number of prey left: 128	Number of predators left: 53
Number of predators left: 131	Number of prey left: 993
Number of prey left: 129	Number of predators left: 55
Number of predators left: 132	Number of prey left: 988
Number of prey left: 130	Number of predators left: 58
Number of predators left: 133	Number of predators tert. 50 Number of prey left: 981
	• •
Number of prey left: 128	Number of predators left: 61
Number of predators left: 135	Number of prey left: 977
Number of prey left: 128	Number of predators left: 63
Number of predators left: 137	Number of prey left: 973
Number of prey left: 128	Number of predators left: 66
Number of predators left: 137	Number of prey left: 970
Number of prey left: 129	Number of predators left: 67
Number of predators left: 138	Number of prey left: 966
Number of prey left: 129	Number of predators left: 69
Number of predators left: 140	Number of prey left: 962

Number of predators left: 72	Number of predators left: 131
Number of prey left: 955	Number of prey left: 807
Number of predators left: 74	Number of predators left: 132
Number of prey left: 949	Number of prey left: 802
Number of predators left: 76	Number of predators left: 135
Number of prev left: 944	Number of prevalent: 133
Number of predators left: 77	Number of predators left: 137
Number of prey left: 936	Number of prey left: 791
Number of predators left: 80	Number of predators left: 139
Number of prey left: 931	Number of prey left: 788
Number of predators left: 81	Number of predators left: 141
Number of prey left: 926	Number of prey left: 783
Number of predators left: 84	Number of predators left: 143
Number of prey left: 921	Number of prey left: 779
Number of predators left: 85	Number of predators left: 146
Number of prey left: 916	Number of prey left: 773
Number of predators left: 86	Number of predators left: 149
Number of prey left: 912	Number of prey left: 765
Number of predators left: 89	Number of predators left: 151
Number of prey left: 908	Number of prey left: 762
Number of predators left: 92	Number of predators left: 154
Number of prey left: 901	Number of prey left: 756
Number of predators left: 94	Number of predators left: 156
Number of prey left: 896	Number of prey left: 753
Number of predators left: 95	Number of predators left: 159
Number of prey left: 892	Number of prey left: 750
Number of predators left: 97	Number of predators left: 162
Number of prey left: 884	Number of prey left: 745
Number of predators left: 99	Number of predators left: 164
Number of prey left: 876	Number of prey left: 742
Number of predators left: 101	Number of predators left: 165
Number of prey left: 868	Number of prey left: 738
Number of predators left: 104	Number of predators left: 168
Number of prev left: 862	Number of prev left: 731
Number of predators left: 107	Number of predators left: 169
Number of prey left: 856	Number of prey left: 728
Number of predators left: 110	Number of predators left: 172
Number of prey left: 851	Number of prey left: 725
Number of predators left: 113	Number of predators left: 174
Number of prey left: 849	Number of prey left: 722
Number of predators left: 116	Number of predators left: 176
Number of prey left: 842	Number of prey left: 714
Number of predators left: 119	Number of predators left: 178
Number of prey left: 838	Number of prey left: 710
Number of predators left: 121	Number of predators left: 179
Number of prey left: 832	Number of prey left: 705
Number of predators left: 123	Number of predators left: 182
Number of prev left: 829	Number of prevalent: 700
Number of predators left: 126	Number of predators left: 183
Number of prev left: 826	Number of prevaleft: 696
Number of predators left: 128	Number of predators left: 184
Number of prey left: 820	Number of prevalers tert: 184 Number of prey left: 690
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Number of predators left: 130	Number of predators left: 187
Number of prey left: 814	Number of prey left: 684

Number of predators left: 189	Number of predators left: 239
Number of previleft: 677	Number of prev left: 543
Number of predators left: 191	Number of predators left: 240
Number of prey left: 673	Number of prey left: 536
Number of predators left: 192	Number of predators left: 241
Number of prey left: 668	Number of prey left: 529
Number of predators left: 194	Number of predators left: 244
Number of prev left: 663	Number of prev left: 522
Number of predators left: 195	Number of predators left: 247
Number of prey left: 659	Number of prey left: 520
Number of predators left: 197	Number of predators left: 250
Number of prey left: 656	Number of prey left: 517
Number of predators left: 200	Number of predators left: 253
Number of prey left: 653	Number of prey left: 512
Number of predators left: 202	Number of predators left: 256
Number of prey left: 649	Number of prey left: 509
Number of predators left: 204	Number of predators left: 259
Number of prey left: 645	Number of prey left: 502
Number of predators left: 205	Number of predators left: 260
Number of prey left: 641	Number of prey left: 497
Number of predators left: 206	Number of predators left: 262
Number of prey left: 636	Number of prey left: 489
Number of predators left: 208	j_pec2@ares:~/JPMainDir/CSC122/Port3/animallab\$./AnimalLabDriverV2.out
Number of prey left: 630	Enter prey name: Rabbit
Number of predators left: 210	Enter predator name: Fox
Number of prey left: 627	Enter Prey population: 100
Number of predators left: 211	Enter Predator population: 100
Number of prey left: 622	Enter how many generations: 100
Number of predators left: 214	Enter lower bound for speed: 3
Number of prey left: 616	Enter Upper bound for speed: 6
Number of predators left: 216	Enter lower bound for food: 3
Number of prey left: 610	Enter Upper bound for food: 4
Number of predators left: 218	
Number of prey left: 606	For Prey
Number of predators left: 219	Enter lower bound for birthrate: 1
Number of prey left: 600	Enter Upper bound for birthrate: 2
Number of predators left: 222	Enter lower bound for death rate: 3
Number of prey left: 593	Enter Upper bound for death rate: 4
Number of predators left: 225	
Number of prey left: 584	For Predators
Number of predators left: 226	Enter lower bound for birthrate: 1
Number of prey left: 576	Enter Upper bound for birthrate: 2
Number of predators left: 228	Enter lower bound for death rate: 3
Number of prey left: 574	Enter Upper bound for death rate: 4
Number of predators left: 229	Enter lower bound for hunger for predators: 10
Number of prey left: 568	Enter Upper bound for hunger for predators: 15
Number of predators left: 231 Number of prev left: 563	Enter Upper bound how many predators could eat prey: 10 Initial Predator Pop: 100
Number of predators left: 233	Initial Prev Pop: 100
Number of predactors tert: 255 Number of prey left: 557	Number of predators left: 98
Number of predators left: 235	Number of previous tert: 98
Number of prevaleft: 553	Number of predators left: 96
Number of predators left: 236	Number of previleft: 91
Number of prevaleft: 548	Number of predators left: 95
number of prey cere. 540	Namber of predators tert. 35

Number of prey left: 87	Numbe
Number of predators left: 93	Numbe
Number of prey left: 84	Numbe
Number of predators left: 90	Numbe
Number of prey left: 78	Numbe
Number of predators left: 89	Numbe
Number of prey left: 77	Numbe
Number of predators left: 87	Numbe
Number of prey left: 75	Numbe
Number of predators left: 85	Numbe
Number of prey left: 73	Numbe
Number of predators left: 84	Numbe
Number of prey left: 70	Numbe
Number of predators left: 83	Numbe
Number of prey left: 69	Numbe
Number of predators left: 81	Numbe
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ber of prey left: 19 ber of predators left: 45 ber of prey left: 17 ber of predators left: 44 ber of prey left: 15 ber of predators left: 43 ber of prey left: 14 ber of predators left: 41 ber of prey left: 12 ber of predators left: 40 ber of prey left: 11 ber of predators left: 37 ber of prey left: 9 ber of predators left: 34 ber of prey left: 7 ber of predators left: 32 ber of prey left: 6 ber of predators left: 31 ber of prey left: 3 ber of predators left: 30 ber of prev left: 1 ber of predators left: 29 ber of prey left: 1 ber of predators left: 27 ber of prey left: 1 ber of predators left: 25 ber of prey left: 2 ber of predators left: 23 ber of prey left: 1 ber of predators left: 21 ber of prey left: 2 ber of predators left: 19 ber of prey left: 1 ber of predators left: 18 ber of prey left: 2 ber of predators left: 16 ber of prey left: 1 ber of predators left: 14 ber of prey left: 1 ber of predators left: 11 ber of prev left: 1 ber of predators left: 9 ber of prey left: 1 ber of predators left: 8 ber of prev left: 1 ber of predators left: 6 ber of prey left: 1 ber of predators left: 4 ber of prey left: 1 ber of predators left: 2 ber of prey left: 2 ber of predators left: 1 ber of prey left: 2 ber of predators left: 1

Number of prey left: 1 Number of predators left: 2 Number of prey left: 2 Number of predators left: 1 Number of prev left: 1 Number of predators left: 1 Number of prey left: 2 Number of predators left: 2 Number of prey left: 2 Number of predators left: 2 Number of prev left: 2 Number of predators left: 2 Number of prev left: 1 Number of predators left: 2 Number of prev left: 1 Number of predators left: 2 Number of prev left: 1 Number of predators left: 1 Number of prey left: 1 Number of predators left: 2 Number of prev left: 2 Number of predators left: 2 Number of prev left: 2 Number of predators left: 1 Number of prey left: 1 Number of predators left: 1 Number of prey left: 1 Number of predators left: 1 Number of prey left: 2 Number of predators left: 1 Number of prev left: 2 Number of predators left: 2 Number of prev left: 2 Number of predators left: 1 Number of prey left: 1 Number of predators left: 2 Number of prev left: 1 Number of predators left: 2 Number of prev left: 1 Number of predators left: 2 Number of prev left: 1 Number of predators left: 1 Number of prey left: 1 Number of predators left: 1 Number of prey left: 1 Number of predators left: 1 Number of prey left: 1 Number of predators left: 1 Number of prey left: 1 Number of predators left: 1 Number of prev left: 1 Number of predators left: 2 Number of prey left: 2 Number of predators left: 1

Number of prey left: 1 Number of predators left: 2 Number of prey left: 2 Number of predators left: 1 Number of prev left: 2 Number of predators left: 1 Number of prey left: 1 Number of predators left: 2 Number of prey left: 2 Number of predators left: 2 Number of prev left: 2 Number of predators left: 2 Number of prev left: 2 Number of predators left: 2 Number of prev left: 2 Number of predators left: 2 Number of prev left: 2 Number of predators left: 1 Number of prey left: 2 Number of predators left: 1 Number of prev left: 2 Number of predators left: 1 Number of prev left: 2 Number of predators left: 1 Number of prey left: 1 Number of predators left: 2 Number of prey left: 1 Number of predators left: 1 Number of prey left: 2 Number of predators left: 2 Number of prev left: 1 Number of predators left: 1 Number of prev left: 2 j pec2@ares:~/JPMainDir/CSC122/Port3/animallab\$ ls AnimalLabDriverV2.cpp Animalnfo.txt animalV2.h typescript AnimalLabDriverV2.out AnimalTPQ.txt randVal.h j pec2@ares:~/JPMainDir/CSC122/Port3/animallab\$ cat AnimalTPQ.txt 1. How many hierarchies do you have? Why? Just one, the base animal is the parent, and the predator and prev classes are the children. I did this since it made logical sense to me, predators and prev are both animals. ("is a" relationship) but not all animalsa are predators. and vice versa.

- 2. How many classes are in the hierarchy(ies)? How many levels does this hierarchy(ies) have?
- ${\bf 3}$ classes, the baseAnimal class, the prey class and the predator class.

the hiearchy has 2 levels I think.

3. What members did you make protected? Private?

I made everything private except getters and setters and special functions as needed, since I think its good practice to have the default be private for member vars.

4. What kind of inheritance mode(s) did you use for your inheritance?

class Child : public Parent

I did it this way since the children uses alot of data from the parent's member vars (like speed).

5. Have you used any composition?
Or is your entire program dependant on inheritance?

My entire program is dependant on inheritance

- 6. How many arrays do you have to hold your simulation's population? How 'weildy' is this?
- I have two arrays, one for predators and one for prey. I think its pretty weildy for this application.
- 7. What sort of initial counts cause predators to reign? Prey?