

EECS 22: Advanced C Programming Assignment 1

Outline

- Rabbit Ecosystem and Demography
- Compile
- Assignment Submission
- Verify the Submission

Assignment 1

Rabbit Ecosystem and Demography

- Write a C program that analyzes *rabbit* and *wolf* population in an island and its influence on the *grass area*.
 - *Grass area* in the island grows at a constant rate every year but is gradually depleted due to continuous consumption by *rabbits*.
 - *Rabbit* population grows at a constant rate every year but is constrained by *wolves* attack.
 - *Wolf* population grows at a constant rate every year but rapid decline occur in regular intervals through spread of epidemic diseases.
-
- $\text{Wolf Population} = \text{Previous Wolf Population} * (1 + \text{Wolf Growth Rate}/100)$
 - $\text{Rabbit Population} = \text{Previous Rabbit Population} * (1 + \text{Rabbit Growth Rate}/100) - \text{Previous Wolf Population}$
 - $\text{Grass Area} = \text{Previous Grass Area} * (1 + \text{Grass Growth Rate} /100) - \text{Previous Rabbit Population} * 1.2$

Assignment 1

Input: Enter wolf population (initial): 10
Enter rabbit population (initial): 2300
Enter total grass area, initially fertile (in sq yards): 40000
Enter wolf annual growth rate (in percentage): 20
Enter rabbit annual growth rate (in percentage): 30
Enter grass area annual growth rate (in percentage): 5

Output:

Year	Wolf population	Rabbit population	Available Grass Area
0	10	2300	40000.00
1	12	2490	39240.00
2	14	2637	38214.00
3	16	2728	36960.30
4	19	2746	35534.72
5	22	2619	34016.25
6	11	2304	32574.26
7	13	2445	31438.18
8	15	2528	30076.09
9	18	2536	28546.29
10	21	2396	26930.40
11	10	2064	25401.72
12	12	2183	24195.01
13	14	2237	22785.16
14	16	2208	21240.02
15	19	2070	19652.42
16	9	1741	18151.04
17	10	1813	16969.39
18	12	1856	15642.26
19	14	1812	14197.18
20	16	1655	12732.63

Assignment 1:Notes

- Use a loop so that table is printed for 20 consecutive years
- For year 0, only initial values are displayed
- For available grass area, use double type variables, and print out exactly 2 digits after the decimal point
- Ensure that all the numbers in the output table line up nicely so that the decimal points are all at the same column position.
- Use suitable number of tab characters in print statements to align the table output in same fashion as above.
- Wolf and rabbit population are integers, and fractions due to growth rate multiplications need to be ignored (equivalent to flooring).

Submit three files:

- *rabbit.c* : the code
- *rabbit.txt*: a text file briefly explaining how you designed your program
- *rabbit.script* : a typescript which shows that you compile your program and run it

Bonus: Minimum and maximum population

- Calculate and print the minimum and maximum population of rabbits and wolves over these 20 years.
- Along with the minimum and maximum values, also print the corresponding year.
- Example :

```
Wolf population was minimum as 9 in year 16  
Wolf population was maximum as 22 in year 5  
Rabbit population was minimum as 1655 in year 20  
Rabbit population was maximum as 2746 in year 4
```

Assignment 1

- Compiling

```
% gcc rabbit.c -ansi -Wall -o rabbit  
% ./rabbit
```

Assignment Submission

– Log in to crystalcove

```
→ % ls
hw1/
→ % /ecelib/bin/turnin22
=====
EECS 22 FALL 2013:
Project "hw1" submission for eeecs22
Due date: Mon Oct 7 23:00:00 2013
* Looking for files:
* rabbit.c
* rabbit.txt
* rabbit.script
=====
Please confirm the following:
"I have read the Section on Academic Honesty in the
UCI Catalogue of Classes (available online at
http://www.editor.uci.edu/catalogue/appx/appx.2.htm#gen0)
and submit myoriginal work accordingly."
Please type YES to confirm.  y
=====
change mode
Submit rabbit.c [yes, no]? y
File rabbit.c has been submitted
Submit rabbit.script [yes, no]? y
File rabbit.script has been submitted
Submit rabbit.txt [yes, no]? y
File rabbit.txt has been submitted
=====
Summary:// =====
Submitted on Tue Sep 17 12:38:10 2013
You just submitted file(s):
rabbit.c
rabbit.script
rabbit.txt
```


Verify Code Submission

→ % `/users/grad2/doemer/eecs22/bin/listfiles.py`

```
=====
EECS 22 Fall 2013: "hw1" listing for eeecs22
=====
```

```
Files submitted for assignment "hw1":
```

```
rabbit.c
rabbit.script
rabbit.txt
```