**SE 421 Fall 2022 Homework 2 (30 points), Assigned: 9/30, due: Friday, 10/7**

**Name (Last, First): Duberstein, Wyatt**

You are given the complete XINU code. The line numbers are as in the included dskenq, dskqopt, and dsinter codes.

**Submission**: (a) The answers should be typed. (b) The first page should include the top two lines with your last and the first name. (c) Include the questions followed by answers.

Name the submission file HW2-lastname-firstname.

This homework will be discussed in class on Friday, 9/30. Listen to the lecture before asking questions. The last two MCQs will help you. Review them.

*The submission and late policy are as described in the syllabus* (see the section **Homework and Project Submission Policy)**

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1. (6 points) Fill the following table by applying the pattern (discussed in the class) to determine the feasibility of execution sequences in dskqopt for each of its three callers: dsread, dswrite, and dsksync

|  |  |  |  |
| --- | --- | --- | --- |
| **Governing Conditions in dskqopt** | Feasible or not when called from | | |
| **dsread** | **dswrite** | **dsksync** |
| drptr->drop==DSYNC || (drptr->drop==DREAD && p->drop==DREAD) | Yes | No | Yes |
| drptr->drop == DSEEK | No | No | No |
| p->drop == DSEEK | Yes | Yes | Yes |
| p->drop==DWRITE && drptr->drop==DWRITE | No | Yes | No |
| drptr->drop==DREAD && p->drop==DWRITE | Yes | No | No |
| drptr->drop==DWRITE && p->drop==DREAD) | No | No | No |

1. (9 points) In dskenq and dskqopt, the drptr is aliased and it is accessible using devptr, a pointer to a structure of type devsw which is declared in one of the header files included in dswrite. Answer the following:
2. Which header file declares the structure devsw? (1 point)

conf.h

1. Randomly check ten \*.c files. List the ten files you have checked. For each of them, indicate if the file contains conf.h? (3 points)
   1. dgmcntl.c = Yes
   2. dgmopen.c = Yes
   3. dgread.c = Yes
   4. dot2ip.c = Yes
   5. dsinter.c = Yes
   6. dskbcpy.c = Yes
   7. dgparse.c = Yes
   8. dsopen.c = Yes
   9. dsread.c = Yes
   10. dsseek.c = Yes
2. *Find five files* (do not include dsinter.c) that include conf.h and a freebuf call. List these files. For each of them give the number of freebuf calls. (3 points)

rarp\_in.c = 1 call

ip\_in.c = 2 calls

icmp\_in.c = 2 calls

ibget.c = 1 call

ethinter.c = 2 calls

1. Of the *five files you found*, does any one of them include a freebuf that frees memory using drptr, a pointer to a structure of the type dreq - Yes or No? If yes, give the name of the file. (2 points)

No. I did find one that I didn’t list that did that, dsread.c.

1. (11 points) The file dsinter.c includes conf.h and a freebuf call using drptr. Answer the following questions for dsinter.c.
2. How many execution sequences are there? (2 points)

40

1. List all the execution subsequences starting at line 27. (3 points)

27,28,29,31,33,34

27,28,29,31,32,33,34

27,28,29,31,32,36,37,40,42

27,28,29,31,32,36,39,40,42

27,28,29,31,32,36,39,42

27,29,31,33,34

27,29,31,32,33,34

27,29,31,32,36,37,40,42

27,29,31,32,36,39,40,42

27,29,31,32,36,39,42

1. Is 17, 18, 19(F), 23(F), 26, 27(F), 29, 31, 32, 33, 34 a feasible execution sequence for analyzing the memory leak for dswrite – yes, or no? If yes, justify in one sentence. (2 points)

No, because the freebuf methods are never used so you can’t experience the behavior of those methods

1. Is 17, 18, 19(F), 23(F), 26, 27(F), 29, 31, 32, 36, 37, 39, 42 a feasible execution sequence for analyzing the memory leak for dswrite – yes, or no? If yes, justify in one sentence. (2 points)

Yes, since the memory is freed then it can be analyzed

1. Does dsinter free the memory allocated in dswrite – yes, or no? If yes, give the relevant line number. (2 points)

Yes, line 40

4. (4 points) Answer True or False for each the following questions to summarize the memory leak analysis for the allocation in dswrite.

1. The feasible dskenq execution sequences have two possibilities: (a) drptr is aliased and it is accessible through devptr or dsptr, (b) aliased drptr is passed to dskqopt.
   1. True
2. The feasible dskqopt execution sequences have two possibilities: (a) drptr is aliased and it is accessible through devptr or dsptr, (b) the memory is deallocated by freebuf(drptr).
   1. False
3. The feasible dsinter execution sequences have two possibilities: (a) a *panic* alert, (b) the memory is deallocated by freebuf(drptr).
   1. False
4. Except the case of *panic* alert, the allocated memory allocated is always deallocated.
   1. False

Use the line numbers from the following dswrite, dskenq, dskqopt, and dsinter codes

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application, email

Description automatically generated

Graphical user interface, application

Description automatically generated

Graphical user interface, text, application

Description automatically generated