**Assignment 8 (20 points), SE 421, 10/27/2021, due: Wednesday, 11/3/2021**

**Name (Last, First):**

**Electronic Copy Requirement**: (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 question for each answer. (d) The file should be named HW6-lastname-firstname.

**Prerequisite:** Index XINU in Atlas.

**Problem 1 (3 points):** Answer the following questions for the function *dswrite.*

1. List all functions that get access to the memory allocated in *dswrite*? For each of those functions identify the mechanism used to provide the access. Choose from the following mechanisms: (a) access by passing parameter through a call chain, (b) passed as a return value, (c) global variable. Note: it can be multiple mechanisms in some cases. (2 points)
   1. **Dsinit.c, dsktrt.c**
   2. **Dskenq,**
   3. **dskqpot**
2. Where is *dvioblk* declared, and where is it initialized? (1 point)
   1. It gets declared on line 23 of ***“conf.h”*** and the it is initialized on line 13 of “dsinit.c”

**Problem 2 (2 points):** Does the pointer *packet* in the function *sndrarp* have access to the memory allocated in the *dgwrte* function? Give precise reasoning. (2 points)

**Problem 3 (5 points):** The following questions are for the function *dgwrite.*

Background: The memory is allocated for a structure of type *epacket,* and the pointer *packet* points to the allocated memory. The functions *getbuf* and *freebuf* respectively allocate and deallocate memory.

1. Show the call graph of *dgwrite*. (1 point)

Diagram

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1. Show the truncated call graph of *dgwrite* to retain only the call chains to either *getbuf* or *freebuf*. Note: The truncated graph is the subgraph of the call graph with *getbuf* and freebuf as leaves. (2 points)

A picture containing text, sky, map

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1. Find the truncated call graph of *dgwrite* to retain the functions that reference (read or write) to the structure of type *epacket*. (2 points)

**Problem 4** **(5 Points):** Compute the number of interprocedural control flow paths. Assume that **f** has 2 paths, **g** has 3 paths, and **h** has 5 paths. Mark on each node the number of paths from the node to leaves. Algebraic expressions (e.g., 22 + 32 + 3\*5 + 1) are acceptable for the number of paths.

Diagram

Description automatically generatedvoid foo(){

g();

if(C1){

f();

}

if(C2){

if(C3){

h();

return;

}

if(C4){

f();

}

f();

}

h();

}

**Problem 5 (5 points):** Answer the following four questions for the function *dskqopt* based on the DAG given below.

1. On how many paths, *drptr* is passed as a parameter to callee functions. (1 point)
2. On how many paths, *drptr* is assigned to another pointer (pointer aliasing) (1 point)
3. How many paths are infeasible when *dskqopt* gets called from *dswrite*? Give for one path the precise reason why the path is infeasible. (3 points)

Chart

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X