**Homework #2 Manual Program Repair**

In this assignment, we are going **to manually find the memory deallocation error and fix it.** In the HW2 file, there are five source codes (e.g., **bug\_1.c ~ bug\_5.c)**, where each code has one of the memory deallocation errors (e.g., memory leak, double free and use-after free).

In this assignment, you should **(1) choose one of the memory deallocation errors in each code**, **(2) explain the root cause of the memory deallocation error, and (3) generate the minimum correct patch for fixing the memory deallocation error for each code**; to answer the third question, you can report the screenshot of the patched code or explain which code lines need to be fixed.

(You just copy the second page of this document for answering these questions for each code.)

**Submission**

**- HW2\_studentid\_studentname.pdf (HW2\_2022711684\_차수영)**

**- Due date: 2023-05-15, 23:59:00**

**- No late submission. (score = 0)**

I provide an example of how each question should be answered for the following toy code. Please read this example and if you have any questions, please contact TA by email.

텍스트이(가) 표시된 사진

자동 생성된 설명

(1). What kind of memory deallocation error is there in the source code? (0.5)

1. memory leak **2. double free** 3. use-after free

(2). What is the root cause of the memory deallocation error in the source code? (0.5)

**When the program execution exercises the ‘else’ branch condition at line 7, the double-free**

**error occurs as the object that ‘p’ points to is deallocated twice at line 9 and 10.**

(3). What is the minimum correct patch for fixing the memory deallocation error? (1)

(The minimum patch is the patch code with the smallest code change that corrects the root cause.)

**Insert free(p) at line 4 and remove the free(p) at line 9.**

\*\* copy this page to your submit document!! \*\*

###[bug\_1.c ~ bug\_5.c]

**(1). What kind of memory deallocation error is there in the source code? (0.5p)**

1. memory leak 2. double free 3. use-after free

**(2). What is the root cause of the memory deallocation error in the source code? (0.5p)**

**(3). What is the minimum correct patch for fixing the memory deallocation error? (1p)**

(The minimum correct patch is the patch code with the smallest code change that corrects the root cause.)