

CS 32, Fall 2012  
Hw4: 50 total points

Print this form, staple loose pages together, and write your answers on it.

Accepted: files by `turnin` before your lab section on Thursday, November 1,  
plus this paper at the beginning of your lab section on November 1.  
No email submission allowed.

Name (1 pt): \_\_\_\_\_

Umail (1 pt): \_\_\_\_\_@umail.ucsb.edu

Lab Section (1 pt) Circle one:                    5:00                    6:00                    7:00

For programming-related tasks, either place a check mark on the "done" line if you (and your partner) successfully did it, or write a brief explanation.

1. (15 pts.) 1. Separate the parts of grading2.cpp from Lab03 into three different files, based on what you learned in Lab04 about separate compilation. And create a Makefile to compile them into an executable named grading3. Store all three program parts plus the Makefile in your directory ~/cs32/hw4/.

#1 done: \_\_\_\_\_  
(check, or say why not)

2. Read the following (partial) Makefile and then answer the questions:

```
CC = g++
CFLAGS = -c -g -Wall
LDFLAGS =
SOURCES = main.cpp functions.cpp
DEPS = functions.h
OBJECTS = $(SOURCES:.cpp=.o)
EXECUTABLE = hello

$(EXECUTABLE) : $(OBJECTS)
    $(CC) $(LDFLAGS) $(OBJECTS) -o $@

%.o: %.cpp $(DEPS)
    $(CC) $(CFLAGS) *.cpp
```

a. (3 pts.) Although blank here, what is the LDFLAGS normally used for?

b. (3 pts.) what is the \$@ used for?

c. (4 pts.) Explain with your own words what do the following lines do?

```
%.o: %.cpp $(DEPS)
    $(CC) $(CFLAGS) *.cpp
```

4. (6 pts.) Fix the bug in buggy1.cpp that you found in Step 5 of Lab04.  
Hint: see pp. 468-469 in Chapter 8 of the Savitch textbook.

#4 done: \_\_\_\_\_

5. (10 pts.) Use gdb to find the error in buggy2.cpp (which you should have copied from ~/cs32/labs/lab04/ for the "After lab-work" of Lab04). Also fix it.

#5 done: \_\_\_\_\_

6. (6 pts.) Briefly explain the strategy you used to debug buggy2 in part 5. Include gdb commands used, and other relevant details.

End of Hw4

Turn-in instructions:

- A. Be sure that all of the following files are in your ~/cs32/hw4/ directory:
- 3 program files plus a Makefile for Problem #1
  - your fixed copy of buggy1.cpp - including your name(s) in a comment
  - your fixed copy of buggy2.cpp - including your name(s) in a comment

Clean everything else from that directory.

Then cd to that directory's parent:

```
cd ~/cs32/
```

Finally, use the turnin program as follows to turn in all 6 files at once:

```
turnin hw4@cs32 hw4
```

If you worked with a partner, then just turn in one copy for both of you, and enter your partner's name on the following line:

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- B. Each student must turn in this completed paper at your next lab.