Duration: **60 minutes**
Aids Allowed: **none**

Student Number: |_|_|_|_|_|_|_|_|_|_|_|

Family Name(s): _____

Given Name(s): _____

Lecture Section: ☐ LEC0101 (Monday 11am) ☐ LEC0102 (Monday 5pm)

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*Do **not** turn this page until you have received the signal to start.*
In the meantime, please read the instructions below *carefully*.

This term test consists of 3 questions on 10 pages (including this one), printed on both sides of the paper. *When you receive the signal to start, please make sure that your copy of the test is complete, fill in the identification section above, and write your name on the back of the last page.*

Answer each question directly on the test paper, in the space provided, and use one of the "blank" pages for rough work. If you need more space for one of your solutions, use a "blank" page and *indicate clearly the part of your work that should be marked.*

When writing code, assume all input is valid unless indicated otherwise (*i.e.*, do not waste time writing code to perform error-checking). Comments are not required (except where indicated), but they may help us give you partial credit, especially if your solution is incomplete.

MARKING GUIDE

1: _____/15

2: _____/15

3: _____/15

TOTAL: _____/45

Good Luck!

Question 1. [15 MARKS]

For each part of this question, state what will happen when the code is compiled and run (use the space to the right of the code). Some of the code contains bugs, which you should identify. Some of the code produces output, which you should write down. Some of the code may do a bit of both...

Part (a) [2 MARKS]

```
const int x = 10;
int y = 5;

if (x = 20)  y++;
printf("x = %d, y = %d\n", x, y);
```

Part (b) [1 MARK]

```
int x = 99L;
int y = 0xa9s;

printf("%d, %d\n", x, y);
```

Part (c) [1 MARK]

```
int x = -1;

if (x)  printf("This is true.\n");
else    printf("I don't think so!\n");
```

Part (d) [2 MARKS]

```
char x = 500;

if (x == 500)  printf("This is true.\n");
else           printf("I don't think so!\n");
```

Question 1. (continued)

Part (e) [2 marks]

```
int x = 20;

if (x < 10)
    printf("Too small!\n");
    printf("Try again...\n");
else
    printf("Okey-dokey.\n");
```

Part (f) [2 marks]

```
int i = 3;

do { printf("%d...\n", i); } while (--i > 0);
printf("Go!\n");
```

Part (g) [2 marks]

```
int x = 10, *y = &x, z = 20;

printf("%d, %d, %d\n", x, *y, z);
*y = 5;
printf("%d, %d, %d\n", x, *y, z);
y = &z;
printf("%d, %d, %d\n", x, *y, z);
```

Part (h) [3 marks]

```
double a[] = {-3.1415, 0, 1.5, 2.7e14, 9999};
double *p = a;

while (*p++ != 9999)  printf("%g, ", *p);
printf("\n");
```

Question 2. [15 MARKS]

Part (a) [5 MARKS]

Complete the function below so that it satisfies its documentation.

```
/* Print a description of a number grade: "Invalid." if grade is negative or greater
 * than 100; "Pass!" if grade is 50 to 100; "Fail..." if grade is 0 to 49. */
void describe(int grade)
{




}
```

Part (b) [5 MARKS]

Write code below to read 50 values from the user and store them into the array `list`. Assume that the input is error-free. Remember to declare any extra variables you use.

```
double list[50];
```

Question 2. (continued)

Part (c) [5 marks]

Fill in the parameters and body of function `decompose` according to its documentation.

```
/* This function takes a long argument representing a 10-digit telephone number and
 * three pointers to ints.  It assigns the area code (the first 3 digits of the phone
 * number) to the memory location given in the first pointer, the next 3 digits of the
 * phone number to the second pointer, and the last 4 digits of the phone number to
 * the last pointer.  See further below for an example of how it is called.  Assume
 * that the area code never starts with '0', and neither does the 7-digit base number.
 */
void decompose(                                                                    )
{









}

int area, first, second;
decompose(4169783707L, &area, &first, &second);
printf("(%d) %d-%4d", area, first, second);
// The statement above prints "(416) 978-3707" (without quotes).
```

Use the space on the rest of this page for scratch work, or for any answer that did not fit elsewhere.
Clearly label each answer with the appropriate question and part number.

Question 3. [15 MARKS]

Write a complete program to "censor" all digits from a file. When it is executed, your program will:

- ask the user for input and output filenames *(each filename will be less than 80 characters long)*;
- copy the contents of the input file to the output file, except that every digit (characters `'0'` to `'9'`) in the input file is replaced by the character `'#'` in the output file.

For example, if the input file contains:

```
In the next 60 minutes, you must complete all 3 questions on the 10 pages
of this test...
```

then the output file will contain:

```
In the next ## minutes, you must complete all # questions on the ## pages
of this test...
```

after running your program.

- *Your answer must be a* complete *program,* i.e., *it must have a* `main` *function, appropriate* `#include` *directives,* etc.
- *Part of your grade will be for style and design,* i.e., *it's not enough for your code to work correctly, it must also be well written — think about helper functions, preprocessor constants,* etc.
- *In particular, use your* `main` *function to handle all user interaction and opening/closing files, and write a helper function to handle copying data from one file to the other while replacing digits.*
- *Your program should produce an appropriate error message if it is unable to open one of the files, but you do* ***not*** *have to handle read/write errors while processing the files.*
- *Relax! This is not as difficult as it might seem. Just take it one step at a time.*

Question 3. (continued)

Use the space on this "blank" page for scratch work, or for any answer that did not fit elsewhere.
Clearly label each answer with the appropriate question and part number.

Use the space on this "blank" page for scratch work, or for any answer that did not fit elsewhere.
Clearly label each answer with the appropriate question and part number.

On this page, please write nothing except your name.

Family Name(s): _____

Given Name(s): _____

Total Marks = 45