

EE 200 Exam 1

Tufts University

9 October 2018

Name: _____

Question	Points
Types	15
Numbers and strings	12
Pointers and arrays	18
What happens?	9
Miscellaneous	6
Computer section	30
Total	90

Instructions:

1. This examination contains 7 pages, including this page.
2. The exam has two parts: this pen-and-paper section and a computer section. You must hand in your paper exam before getting out your computer and continuing on to the computer section. You should have the computer questions on a separate sheet of paper, which you may use for scratch work and hand in when you are finished.
3. You have **seventy-five (75) minutes** to complete the examination, including the computer portion. As a courtesy to your classmates, we ask that you not leave during the last ten minutes.
4. Write your answers in this booklet. We scan this into Gradescope, so scratch work on other pieces of paper will not be scanned or counted for credit.

Question 1: Types

- (a) [5 pts] How many bytes are used to store each of the datatypes below?

	1	2	4	8	it depends on the compiler/architecture
int					
char					
double					
float					
int*					

- (b) [6 pts] Given the following declarations:

```
int maple = -1;
float birch = 0.001;
double aspen = 2*birch;
char pine = 'e'; // 'e' is ascii 101
```

What are the datatypes and values of each of these expressions?

aspen + birch

maple * birch

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- (c) [4 pts] Given the same declarations, what values are printed by the following statements?

```
printf("%u\n", (unsigned int)maple);
```

```
printf("%c\n", (char)(pine + maple));
```


Question 3: Pointers and arrays

(a) [6 pts] Given the declarations below:

```
float* nobles[6];  
float xenon = 131.29;
```

What are the types of these expressions? If they are invalid, say so.

`nobles`

`nobles[1]`

`*nobles`

`&nobles`

`&xenon`

`*xenon`

(b) [4 pts] Given the declaration `const float * const * krypton`, which of the following can be legally modified?

`krypton`

`*krypton`

`**krypton`

`&krypton`

(c) [3 pts] What is the purpose of having `const` as part of the C language (i.e., what is it useful for)?

- (d) [5 pts] Write a function `make_checkerboard` which accepts a 2-D array of `int` and fills it with a checkerboard pattern of 1s and 0s. For example, running this on a 4×4 array should give:

```
1 0 1 0
0 1 0 1
1 0 1 0
0 1 0 1
```

Your function should work for a square array of any size greater than 0. The top-left square should always be 1.

Fill in the function arguments below as necessary.

```
void make_checkerboard(                               )
{
```

Question 4: What happens?

In these code segments, the code may not finish, or may not function as intended. Explain what result is printed out, or what happens when the program tries to run.

(a) [3 pts]

```
int grapes[10] = {0};
printf("grape_10_is_%d", grapes[10]);
```

(b) [3 pts]

```
int pineapple[10] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
for(int i = 0; i < 10; i++){
    if(i%2 == 0){
        continue;
    }
    if(i%7 == 0){
        break;
    }
    printf("%d\n", i);
}
```

(c) [3 pts]

```
int* banana_split = 0;
int cherry = 1;
*banana_split = cherry;
printf("result:_%d", *banana_split);
```

Question 5: Just a few more...

[3 pts] What are the differences between a preprocessor macro and a function?

[2 pts] Given the code:

```
float plum;  
float nectarine;  
// Lots of code that computes with 'plum' and 'nectarine'
```

Write code to safely check whether plum and nectarine are equal.

[1 pt] Which of these people are not in this course?

- Zachary Haubert
- Huilin Tong
- Jing Pu
- Victor Oludare
- Emily Carlson
- Wenjie Han

