Who wants to be a C programmer

Preparation for midterm

Game 1

Question 1. 500 points

```
echo $((2 + 3)) | wc -l
```

What is the output (on stdout) from this command?

A	0	C	1
B	5	D	2

Question 1. 500 points

```
echo $((2 + 3)) | wc -l
```

What is the output (on stdout) from this command?

A	0	C	1
B	5	D	2

The correct answer is C.

Question 2. 1,000 points

- Assume you have a terminal open, and the current working directory contains a compiled program called *blurb*.

What is a correct shell command which will get the names of all files in the current directory, redirect the results as input to blurb, and store the output of blurb in a file called output.txt?

A	blurb < (ls) > output.txt
B	blurb < ls > output.txt

C	ls | blurb > output.txt
D	blurb ls | output.txt

Question 2. 1,000 points

- Assume you have a terminal open, and the current working directory contains a compiled program called *blurb*.

What is a correct shell command which will get the names of all files in the current directory, redirect the results as input to blurb, and store the output of blurb in a file called output.txt?

A blurb < (ls) > output.txt

B blurb < ls > output.txt

C ls | blurb > output.txt

D blurb ls | output.txt

The correct answer is C.

Question 3. 2,000 points

```
int y;
// missing code
int x;
x = y;
```

Is there a problem with this code?

A	Compile error	C	Run-time error
B	No errors	D	Possible run-time error

Question 3. 2,000 points

```
int y;
// missing code
int x;
x = y;
```

Is there a problem with this code?

A	Compile error	C	Run-time error
B	No errors	D	Possible run-time error

The correct answer is B.

Question 4. 3,000 points

```
int z;
int x;
x = *z;
```

Is there a problem with this code?

A	Compile error
B	No errors

C	Run-time error
D	Possible run-time error

Question 4. 3,000 points

```
int z;
int x;
x = *z;
```

Is there a problem with this code?

A	Compile error	C	Run-time error
B	No errors	D	Possible run-time error

The correct answer is A.

Question 5. 5,000 points

Here is one line of output from running *ls -l* on the current directory.

```
-rwxr-x--- 1 mgbarsky instrs 8377 Apr 11 10:53 my_prog
```

What the beginning of output would be if you were to run these two commands on current directory:

```
chmod 641 my_prog; ls -l my_prog
```

A	-r-xrw-r--
B	-rw-r----x

C	-rw--w-r--
D	-r-xrw---x

Question 5. 5,000 points

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```
-rwxr-x--- 1 mgbarsky instrs 8377 Apr 11 10:53 my_prog
```

What the beginning of output would be if you were to run these two commands on current directory:

```
chmod 641 my_prog; ls -l my_prog
```

A	-r-xrw-r--	C	-rw--w-r--
B	-rw-r----x	D	-r-xrw---x

The correct answer is B.

Checkpoint 1 reached!

You have 5,000 points

Question 6. 7,500 points

```
void f (int arr[ ]) {
   …
}
```

How does function *f* find the size of the array *arr*?

A	Using *sizeof (arr)*
B	Using *arr.length*
C	The size of *arr* is unknown to *f*
D	Using *sizeof (arr)/sizeof (int)*

Question 6. 7,500 points

```
void f (int arr[ ]) {
   …
}
```

How does function *f* find the size of the array *arr*?

A	Using *sizeof (arr)*	C	The size of *arr* is unknown to *f*
B	Using *arr.length*	D	Using *sizeof (arr)/sizeof (int)*

The correct answer is C.

Question 7. 10,000 points

```
#include <stdlib.h>

int func () {
        int a = 4;
        int *b = (int*) malloc (sizeof(int));
        *b = 5;
        int *c = (int*) malloc (sizeof(int));
        *c = a;
        int *d = c;
        b = c;
       ✹
}
```

When *func* reaches ✹, what are the values stored in variables a, *b, *c, and *d?

A	a:4 *b:5 *c:4 *d:4
B	a:4 *b:4 *c:4 *d:4
C	a:5 *b:4 *c:4 *d:4
D	a:4 *b:5 *c:5 *d:5

Question 7. 10,000 points

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#include <stdlib.h>

int func () {
        int a = 4;
        int *b = (int*) malloc (sizeof(int));
        *b = 5;
        int *c = (int*) malloc (sizeof(int));
        *c = a;
        int *d = c;
        b = c;
       ✸
}
```

When *func* reaches ✸, what are the values stored in variables a, *b, *c, and *d?

A	a:4 *b:5 *c:4 *d:4	C	a:5 *b:4 *c:4 *d:4
B	a:4 *b:4 *c:4 *d:4	D	a:4 *b:5 *c:5 *d:5

The correct answer is B.

Question 8. 15,000 points

```
#include <stdlib.h>

int func () {
        int a = 4;
        int *b = (int*) malloc (sizeof(int));
        *b = 5;
        int *c = (int*) malloc (sizeof(int));
        *c = a;
        int *d = c;
        b = c;
        ✸
}
```

How many times would you need to call *free* to reclaim all dynamically allocated memory?

A	1 time	C	3 times
B	2 times	D	0 times

Question 8. 15,000 points

```
#include <stdlib.h>

int func () {
        int a = 4;
        int *b = (int*) malloc (sizeof(int));
        *b = 5;
        int *c = (int*) malloc (sizeof(int));
        *c = a;
        int *d = c;
        b = c;

}
```

How many times would you need to call *free* to reclaim all dynamically allocated memory?

A	1 time	C	3 times
B	2 times	D	0 times

The correct answer is B.

Question 9. 25,000 points

```
#include <stdlib.h>

int func () {
        int a = 4;
        int *b = (int*) malloc (sizeof(int));
        *b = 5;
        int *c = (int*) malloc (sizeof(int));
        *c = a;
        int *d = c;
        b = c;

}
```

Is there a memory that cannot be freed at this point?

A no, we can free all allocated memory

B yes, memory allocated for b

C yes, memory allocated for c

D both memory allocated for b and for c

Question 9. 25,000 points

```
#include <stdlib.h>

int func () {
        int a = 4;
        int *b = (int*) malloc (sizeof(int));
        *b = 5;
        int *c = (int*) malloc (sizeof(int));
        *c = a;
        int *d = c;
        b = c;
        ✸
}
```

Is there a memory that cannot be freed at this ✸ point?

A	no, we can free all allocated memory	C	yes, memory allocated for c
B	yes, memory allocated for b	D	both memory allocated for b and for c

The correct answer is B.

Question 10. 50,000 points

```
cd top
mkdir top/dir
ls -l top
```

Given the directory structure w5/top, your current directory is w5. *Which* chmod command you need to execute in order for you NOT to be able to do any of the commands above?

A	chmod 100 top
B	chmod 300 top

C	chmod 500 top
D	chmod 600 top

Question 10. 50,000 points

```
cd top
mkdir top/dir
ls -l top
```

Given the directory structure w5/top, your current directory is w5. *Which* chmod command you need to execute in order for you NOT to be able to do any of the commands above?

A	chmod 100 top	C	chmod 500 top
B	chmod 300 top	D	chmod 600 top

The correct answer is D.

Checkpoint 2 reached!

You have 50,000 points

Question 11. 75,000 points

```
#include <stdio.h>

int compute_sum (int numbers[]) {
    int sum = 0;
    for (int i = 0; i < sizeof (numbers); i++)
    {
        sum += numbers[i];
    }
    return sum;
}
```

```
int main () {
    int a[ ] = {1,1,1,1,1,1};
    int result = compute_sum (a);
    printf (“%d”, result);
}
```

What is printed (32-bit system)?

A 0

B 6

C 4

D 1

Question 11. 75,000 points

```
#include <stdio.h>

int compute_sum (int numbers[]) {

    int sum = 0;

    for (int i = 0; i < sizeof (numbers); i++)

    {

        sum += numbers[i];

    }

    return sum;

}
```

```
int main () {

    int a[ ] = {1,1,1,1,1,1};

    int result = compute_sum (a);

    printf (“%d”, result);

}
```

What is printed (32-bit system)?

A	0	C	4
B	6	D	1

The correct answer is C.

Question 12. 150,000 points

```
int *totals[3];
int x;
x = *totals[0];
```

Is there a problem with this code?

A	Compile error	C	Run-time error
B	No errors	D	Possible run-time error

Question 12. 150,000 points

```
int *totals[3];
int x;
x = *totals[0];
```

Is there a problem with this code?

A	Compile error
B	No errors

C	Run-time error
D	Possible run-time error

The correct answer is B.

Question 13. 250,000 points

```
char *s = "hello";
char x;
x = *(s+3);
```

Is there a problem with this code?

A	Compile error	C	Run-time error
B	No errors	D	Possible run-time error

Question 13. 250,000 points

```
char *s = "hello";
char x;
x = *(s+3);
```

Is there a problem with this code?

A	Compile error	C	Run-time error
B	No errors	D	Possible run-time error

The correct answer is B.

Question 14. 500,000 points

```
char *s = "hello";
*(s+4) = ‘\0’;
```

Is there a problem with this code?

A	Compile error
B	No errors

C	Run-time error
D	Possible run-time error

Question 14. 500,000 points

```
char *s = "hello";
*(s+4) = ‘\0’;
```

Is there a problem with this code?

A	Compile error	C	Run-time error
B	No errors	D	Possible run-time error

The correct answer is C.

Question 15. **One million points!**

A	B
2	1
12	2
21	3
33	14

Given 2 files A and B with contents shown above, what will be the result of the following command

```
(head -2 A; tail -2 B) | sort
```

A	2 3 12 14	C	12 14 2 3
B	2 12	D	3 14

Question 15. **One million points!**

A

```
2
12
21
33
```

B

```
1
2
3
14
```

Given 2 files A and B with contents shown above, what will be the result of the following command

```
(head -2 A; tail -2 B) | sort
```

A	2 3 12 14	C	12 14 2 3
B	2 12	D	3 14

The correct answer is C.

Well done!

You are ready for the midterm