$CS241 #02 See C Crash

1. Test your neighbor.
What is the C preprocessor? Give 3 examples of its use in a .c file
When is sizeof evaluated?
What would be a good name for the following macro? What must be true for A?

```
#define NAME(A)    sizeof(A) / sizeof(A[0])
```

2. Complete the following code to return 1 if the c string contains @ character,0 otherwise.
Where will the code crash if called with NULL
`containsAt(NULL);`

```
01   int containsAt(char* ptr) {
02
03
04
05
06
07
08
```

3. Explain how C uses memory from the process address space in each line of the following. (eg. stack, text segment, heap, global). Where do you expect this code to fail?

```
01   int global;
02
03   void test() {
04     char* t1 = "hi";
05     char t2[] = "ab";
06
07     *t2 = 'A';
08     *(t2 + 1) = 'B';
09     t2[1] = 'B';
10     *t1 ='H';
11     t1 = malloc(123);
12   }
```

4. Why is this code broken?

```
01   #define max(a,b) a<b ? a : b
02   int result = max(10,5) + 1;
03   printf("Result:%d", result);
```

5. Spot the error(s)

```
01   double* f1(int n) {
02     int i;
03     double* r = malloc( n* sizeof (double*) );
04     while( i < n) r[i++] = 12.3;
05     return r;
06   }
```

6. Is the following line valid?
```
printf("%p %p", main, malloc);
```

7. Pointer arithmetic
Write a function to return the number of items in an int array before a value of -1 is found. Tricky: Use pointer arithmetic (no counters allowed!)
```
01   count_before(int* array) {
02       int* ptr = array;
```

8. What would you call at line 2 such that p1 can be equal to p2?

```
01   void* p1 = malloc( 10 );

02   ??_____

03   void *p2 = malloc(8);
```

9 When are sprintf and fprintf useful?

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10. For the start of the program, main(int argc, char** argv)

What is special about argv[0]

What is special about argv[argc]

How do you print out all of the arguments of a program?

```
01   int main(int argc, char** argv) {
02
```

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11. Which of the following would print out an
address in the stack?

```
01   int abc = 5;
02
03   int main() { f1( 10, &abc); return 0;}
04
05   int f1(int v1, int* v2) {
06      printf("%p", &v1);
07
08      printf("%p", &v2);
09
10      printf("%p", v2);
11   }
```

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12. Can you write examples of using strcpy, strcat, strlen, strcmp?

13. Which of the following is incorrect? Can you fix it?

```
01   const char* f1() {
02      const char blah[] = "Hello";
03      return blah;
04   }
05
06   const char* f2() {
07      const char* foo = "Hi";
08      return foo;
09   }
10
11   const char* f3() {
12      const char* yo = malloc(2);
13      strcat(yo, "Hi");
14      return yo;
15   }
```

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14. How do I change your variable? Complete the main function to
print the message created by the getMessage function

```
01   int main() {
02      ?
03
04      puts( _____ );
05   }
06   void getMessage(char**mesg) {
07      *mesg = malloc(10);
08      strcpy(*mesg, "I C!");
09   }
```