CMSC216: Bonus Review 3B

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Bonus Review Rules

- ▶ 3 Questions will be shown with about 5min per question, 15min total, time limit enforced on Gradescope Quiz
- ▶ Individual student bonus dots will be calculated as

  BonusDots = floor(log2(TotalCorrectSectionAnswers))
                  – YourIncorrectAnswers
- ▶ Cooperation is allowed and encouraged within your discussion section: the more correct answers in the section, the more bonus points for all
- ▶ Staff will try to facilitate discussion but will not comment on correct/incorrect answers during the quiz
- ▶ Scores will posted after all sections have taken the done the bonus review, likely the following day
- ▶ Student in the Discussion Section with the highest TotalCorrectSectionAnswers will get $+2$ BonusDots
- ▶ Bonus Review is Open Resource just like the exam: https://www.cs.umd.edu/~profk/216/exam-rules.pdf

Staging

- ▶ Open up the Gradescope Bonus Review Quiz for the day
- ▶ Once started, the quiz closes after 15min
- ▶ Get your resources set for the quiz

Okay...

Question 1

```
1  // include headers
2  int main(void) {
3    fork();
4    printf("Once\n");   fflush(stdout);
5    fork();
6    printf("Twice\n");  fflush(stdout);
7    fork();
8    printf("Thrice\n"); fflush(stdout);
9    int ret = wait(NULL);
10   if(ret == -1){
11     printf("Childless cat proc\n");
12   }
13   ret = wait(NULL);
14   if(ret == -1){
15     printf("Meow childless\n");
16   }
17   return 0;
18 }
```

```
>> gcc fork_fun.c
>> ./a.out
Once
...
Twice
...
Thrice
...
Childless cat proc
...
Meow childless
..
```

Which is the correct number of times each output line will appear?

	A	B	C	D	E	F
Once	1	1	1	2	2	2
Twice	2	4	2	4	4	4
Thrice	4	8	6	6	8	8
Childless cat proc	2	6	2	4	4	2
Meow childless	1	2	6	2	6	1

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Question 2

```
1 { // BLOCK 1 //
2   int fd = open(filename, O_RDONLY);
3   struct stat stat_buf;
4   fstat(fd, &stat_buf);
5   int size = stat_buf.st_size;
6   char *chars =
7     mmap(NULL, size, PROT_READ,
8         MAP_SHARED, fd, 0);
9   printf("%c\n",chars[size-1]);
10  munmap(chars, size);
11  close(fd);
12 }
```

```
1 { // BLOCK 2 //
2   int fd = open(filename, O_RDONLY);
3   char ch = 0;
4   while(1){
5     char buf[64];
6     int n = read(fd, buf, 64);
7     if(n==0){
8       break;
9     }
10    ch = buf[n-1];
11  }
12  printf("%c\n",ch);
13  close(fd);
14 }
```

If `filename` is a readable, non-empty file, which of the following best summarizes these two blocks

- ▶ (A) Block 1 and 2 BOTH print the FIRST byte in the file
- ▶ (B) Block 1 AND 2 BOTH print the LAST byte in the file
- ▶ (C) Block 1 prints the FIRST byte, Block 2 prints the LAST byte
- ▶ (D) Block 1 prints the LAST byte, Block 2 prints the FIRST byte
- ▶ (E) Block 1 prints the FIRST byte, Block 2 prints an ARBITRARY byte
- ▶ (F) Block 1 prints an ARBITRARY byte, Block 2 prints the LAST byte

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Question 3

For C programs being compiled and run in the x86-64 architecture, select ALL True statements about the behavior of the Stack region of memory.

- ▶ (A) The stack always contains all Local Variables
- ▶ (B) The stack is always all in Cache Memory
- ▶ (C) The stack is always all in DRAM
- ▶ (D) The stack grows from a high address to a low address
- ▶ (E) The stack always contains all parameters to functions
- ▶ (F) The stack always contains return addresses for functions
- ▶ (G) The stack always contains return values for functions
- ▶ (H) The OS tracks the stack in a process Page Table