CS16, 10S, **H22**, due **Fri Lab 05.26**—More on binary (Oualline, Sections 11.1-11.6)—Total Points: 50
Available online as http://www.cs.ucsb.edu/~pconrad/cs16/10S/homework/H22—printable PDF

Name: (4 pts) _____ Umail Address: (4 pts) _____ @umail.ucsb.edu

Lab Section (2 pts)—circle one: 9am 10am 11am noon unknown

(Note: For now, circle the lab section you are registered for on GOLD. If you need to request attendance at a different lab section because of an ACTUAL SCHEDULE CONFLICT, please email pconrad@cs.ucsb.edu with details)

This assignment is due **IN Lab on Friday, 05.26.**
It may ONLY be submitted Lab, in ESB1003 (Cooper Lab) at 9am, 10am, 11am or noon on Friday.
You must come IN PERSON to turn it in during your assigned Lab section.

Late Policy: No email submission allowed—and don't "slip it under my door". If you need to make it up, you must do so during office hours, or make an appointment to see me, and you must request this appointment within 48 hours of when the assignment was originally due.

Personal Day/Sick Day policy: Everyone is permitted one "personal day/sick day" when you get to make up a missed homework assignment for free during office hours or via appointment. After that, you may not make up the homework assignment—you can only earn back the points through extra credit opportunities.

(For more details, see the syllabus and the homework policy)

For this homework, the preparation is the lecture on 05/26 and/or Sections 11.1 through 11.6 in Chapter 11 in the online book available at these links: from on campus, from off campus

Use the homework link on the course web page, and navigate to this assignment to find these links online.

Note that you can check all of the following answers by typing in the expressions at the Ch prompt and seeing what comes back. **However, you'll have to solve similar problems on the final exam by hand, without a calculator.** So I would encourage you to **use Ch to check your answers, not to come up with your answers.** But you are free to do as you wish. The primary purpose of the homework is to help you prepare for the exams—so how you use Ch here isn't a question of academic honesty, but rather a question of plain old common sense in terms of how to spend your time.

1. (10 pts) For each of the following expressions, show what it will evaluate to, as a simple integer, expressed in decimal format.

   The first two are done for you as examples, and explained in the box at right.

`0x1A` means the hexadecimal value 1A, because any integer that starts with `0x` in C is interpreted as hexadecimal. It evalutes to 26 because `0x1A` is 0001 1010 in binary, and if we add up those bits (16 + 8 + 2) we get 26.

024 means the octal value 24, because any integer that starts with the digit 0 is interpreted as an octal constant. In binary this is 010 100, which evalutes to 20 (16 + 4).

Expression	Value in decimal
0x1A	26
024	20
0x2B	
031	
0xFF	
037	
0x14	

Please turn over for more...

...continued from other side

2. (30 pts) For each of the following expressions, show what it will evaluate to, as a simple integer, expressed in decimal format.

   The first three are done for you as examples, and explained in the box at right.

   See the reading for example of how the ^, << and >> operators work.

   Remember that a logical operator such as `&&` and `||` will always give a result of either 1 or 0, while bitwise operators `&` and `|` give a result that is computed one bit at a time.

> `10 & 7` performs a bitwise and on 10 (1010) and 7 (0111). The result is 2, because the only bit that is 1 in both 1010 and 111 is the 2 bit (i.e. the bit wise and result is 0010).
>
> `0xB & 014` yields a similar result, but this time, we start by recognizing the 0xB is 1011 in binary (converted from hex), and 014 is 1100 in binary (converted from octal). Hence the result is 1000 in binary, or 8 in decimal.
>
> `0x10 | 0x03` gives the answer 19. The reason is that 0x10 is `0001 0000` in binary, and 0x03 is 0000 0011 in binary. When we take the bitwise or, we get 0001 0011 in binary, which is (16 + 2 + 1), i.e 19.

Expression	Value in decimal
`10 & 7`	2
`0xB & 014`	8
`0x10 | 0x03`	19
`8 | 6`	
`8 & 6`	
`1 << 4`	
`64 >> 2`	
`2^4`	
`7 & 2`	
`7 | 2`	
`7 && 2`	
`0x0F & 0xBA`	
`0x0F | 0xBA`	
`6 && 0`	
`6 || 0`	
`6 & 0`	
`6 | 0`	
`6 ^ 7`	

End of H22