

CSci223  
Spring 2005  
Homework #1  
Due: Monday, February 7th

1) What is the main difference between assembly language and high-level programming languages? (4 points)

2) What are the three main abstractions an operating system presents to applications and users? (3 points)

3) Give two examples of things that are represented as files on a UNIX-like operating system that generally aren't represented as files. (3 points)

4) What is the difference between a megabyte and a mebibyte? (3 points)

5) There are  $2^x$  bytes in a kibobyte. What number does  $x$  represent? (3 points)

6) Explain the difference between a megabyte and a megabit. How many megabits are in a megabyte? What are megabits typically used for? (3 points)

7) Who was the primary creator of C? Where was he working at the time? (3 points)

8) Who started the GNU project? What is the purpose of the GNU project? (4 points)

9) What are the four main functions of the C preprocessor? (5 points)

10) Write a complete "Hello, world!" program in C: (3 points)

11) Explain what the `atoi()` function does, and what its name stands for. (4 points)

12) What is the primary reason programmers use hexadecimal to represent numbers instead of binary or decimal? (3 points)

13) Completely fill in the following table with the correct numbers. (8 points)

<i>Decimal</i>	<i>Hexadecimal</i>	<i>Binary</i>
354		
		1011 0101 0110
	0x3AC2	
		0101 1110 0010 1101
5492		
	0xBF08	

14) Convert the following numbers to decimal: (7 points)

$$20121_3 = \underline{\hspace{2cm}}$$

$$268_{13} = \underline{\hspace{2cm}}$$

$$6732_9 = \underline{\hspace{2cm}}$$

15) Convert the following decimal number into base 4: (4 points)

$$763_{10} = \underline{\hspace{2cm}}$$

16) Convert the following decimal number into base 11: (4 points)

$$542_{10} = \underline{\hspace{2cm}}$$

17) How many bytes does a 32-bit Intel processor use to represent a `char`, `int`, `double`, and a pointer? (4 answers) (3 points)

18) What is the memory address of the integer 0x45A30D9B? (3 points)

	0x2348	0x2349	0x234A	0x234B	
	45	A3	0D	9B	

19) The following memory cells contain an integer represented in little endian order. Please write the integer in “logical” order. (3 points)

	0x486E	0x486F	0x4870	0x4871	
	23	A6	6C	05	

20) The terms *little endian* and *big endian* were borrowed from what literary work? Who first used them in a computing context? (3 points)

21) Show the hexadecimal representation of the string “Home Sweet Home!”. (4 points)

22) If the following C code were compiled and executed (assuming a proper `main()`), what would be the value of the variable `x` in decimal and hexadecimal? (5 points)

```
int x = '2' + '2';
```

23) What would the hexadecimal value of  $x$  be on a 32-bit Intel processor? (3 points)

```
int x = ~0;
```

24) Write the value of each of the following C expressions. (4 points)

```
int x = 0;  
int y = 0x01;
```

a) `!0x34`

b) `x || 0x00 || 1`

c) `x && y && 0x01`

25) What is the value of the following C expression? (4 points)

```
int x = ~0;  
x << 8;
```

26) What is the difference between a logical right shift and an arithmetic right shift?  
Which one does C use? (4 points)