

# CMPUT 201 Quiz 1 Instructor: Michael Buro

October 3, 2003 11:00-11:50am

1	3	5	7	9
2	4	6	8	total

## Instructions:

- The quiz is closed book. No conversations, please. Cheating is lame and may have unpleasant consequences.
- **Print** your name and student id on **all** page headings.
- Write your answers **legibly** in the space below or next to the questions. Use a pen. No other sheets are accepted.
- You can use the back sides as scratch space.
- Skip questions you cannot answer immediately and return to them later.
- Each part is worth six marks – **54 in total**.
- **Important:** I won't answer questions during the quiz. If unsure, state your assumptions clearly.

1. What is the value of the following expressions?

A)  $\frac{222}{3}$

B)  $2^8$

C)  $\sqrt{4096}$

2. How many bytes in memory do the following variables occupy on a machine on which all bytes in memory have a 32-bit address?

- A) short \*x;
- B) unsigned short x;
- C) int \*\*\*x;
- D) struct Point { char a, b, c, d; int x, y; } x;
- E) bool x[30][20];
- F) double x;

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Student Id: \_\_\_\_\_

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3. What are the decimal values of the following C++ expressions for `int x=21` :

- A) `x >> 2`
- B) `x << 2`
- C) `x % (x-1)`
- D) `*&x`
- E) `x++`
- F) `++x`

4. Write a C++ function that checks whether a given string is a palindrome. I.e., the function must return `true` if the string reads the same backward and forward and `false` otherwise. E.g. "madam", "otto" are palindromes, "foo" is not.

```
bool palindrome(const char *s)
{
```

```
}
```

5. The following function is supposed to convert all upper-case letters in a given string into lower-case letters. Please correct all syntax and semantic errors using a minimal number of changes.

```
void lowerCase(const char *s) {
    for (i=1; s[i] = 0; ++i) {
        if (s[i] >= "A" && s[i] <= "Z")
            s[i] = s[i] - "A" + "a";
    }
}
```

6. Complete the following functions which manipulate single bits in an unsigned int array which can be regarded as a set of  $n \cdot 32$  bits. The position of the bit in question is given by  $k$  - a number between 0 to  $n \cdot 32 - 1$ . 0 is the index of the least significant bit in  $x[0]$ . Bits are stored consecutively. Try to find one-line solutions.

// sets bit  $k$  in array  $x$

(2 mark)

```
void set_bit(unsigned int x[], int n, int k) {  
    assert(0 <= k && k < n*32);  
  
}
```

// clears bit  $k$  in array  $x$

(4 marks)

```
void clear_bit(unsigned int x[], int n, int k) {  
    assert(0 <= k && k < n*32);  
  
}
```

7. Write a function that reports the number of occurrences of letters (a..zA..Z) in a given string on standard output in the following form:

```
a 10  
b 32  
c 20  
...  
z 1  
A 31  
...  
Z 0
```

```
void letter_histogram(const char *s) {  
    int freq[256]; // letter frequencies stored here
```

```
}
```

8. What is the Unix command for

- A) deleting a file?
- B) copying a file?
- C) listing the current directory contents?
- D) getting information about a Unix command?
- E) changing the current directory?
- F) archiving directories?

9. What is the output of the following program?

```
#include <iostream>

void foo(int &x, int &y) { x++; y--; }

void bar(int *x, int y) { x--; y++; }

int main() {

    int i, x=0;

    for (i=5; i >= 1; --i) { foo(x, i); std::cout << x << ' '; }
    for (i=1; i < 5; ++i) { bar(&x, i); std::cout << x << ' '; }
}
```