CIS 2107. Quiz 3a Solutions. Name:

The quiz is 2 pages and is out of 20 points.

1. **1 point** 5 milliseconds = ? hours

   1. \( \frac{5}{1000} \div \frac{60}{60} \)

2. **1 point** Using the approximation trick we spoke about in class, about how much is \( 2^{36} \)

   2. \( 64 \text{ billion} \)

3. **2 points** What is \( 6086B_1E1B_{16} + 4A882B_{16} \) in base 16?

   \[
   \begin{array}{c}
   \text{6086} B_1 E_1 B_{16} \\
   + \begin{array}{c}
   4 A 8 8 2 B_{16} \\
   \hline
   \end{array}
   \end{array}
   \]

   \[
   \begin{array}{c}
   6 0 8 B 5 A 6 4 6_{16}
   \end{array}
   \]

4. **8 points** Write a function which is passed a string. The function returns 1 if the string contains a double letter in the middle and 0 if it does not. A double letter is defined as \( i.e., \) two consecutive letters that are the same. For example, if the string is \( \text{yellow} \) or \( \text{zipper} \), the function returns 1. Do not use any functions in \(<\text{string.h}>\). No credit given for solutions that use functions in \(<\text{string.h}>\).

   **Solution:** One possibility:

   ```
   int my_strlen(char s[]) {
     int i=0;
     while (s[i]!="\0")
       i++;
     return i;
   }

   int double_in_middle(char s[]) {
     int len=my_strlen(s);
     int mid;
     if (len<2)
       return 0;
     mid=len/2;
     return s[mid]==s[mid-1];
   }
   ```
5. **8 points** A `color_t`, which is defined `typedef uint32_t color_t;`, is used to store how red, green, and blue a particular color is. Each of the three components (i.e., the red, green, and blue values) is stored as an `unsigned char`. Write a function which is passed red, green, and blue values, and returns a `color_t` with the appropriate values set. For example, if the function is passed a red value of 0x27, a green value of 0xA3, and a blue value of 0xFF, the function returns a `color_t` with value 0x0027A3FF.

```
Solution: One possibility:

color_t pack_color(unsigned char r, unsigned char g, unsigned char b) {
    return 0 | (r<<16) | (g<<8) | b;
}
```