Sample Midterm

1. What are all possible outputs of the following code fragment?
   void f(int a, int b) {
       printf("%d %d\n", a, b);
   }

   void main(void) {
       int i = 5;
       f(++i, ++i);
   }

2. Given the definitions
   int numbs[10];
   int *ptr = numbs;
   which of the following are equivalent, and why?
   a. numbs[3]
   b. numbs + 3
   c. *(numbs + 3)
   d. *(ptr + 3)
   e. *ptr + 3

3. Write a recursive function to add the integers from a to b. You may assume that \(a \leq b\) initially.

4. Use the following code fragment to answer parts a, b, and c:
   for(x = i = 0; i <= 100; i += 2, x += i);
   a. In one short sentence, what does this for loop do?
   b. Is the following while loop equivalent? If not, how does its result differ?
      x = i = 0;
      while( i++ = 100) x += ++i;
   c. Does the following for loop do the same thing? If not, what does it do?
      for(x = i = 0; i <= 100; i++){
         if (!(i % 2)) continue;
         x = x + i;
      }

5. What does the following function do?
   int x(char *s, char *t) {
      for( ; *s == *t; s++, t++)
         if (*s == '\0')
            return(0);
      return(*s - *t);
   }

6. What does this function do?
   char *x(char *s, char c) {
       char *r = NULL;
       do{
while(*s && *s != c) s++;  
    if (*s) r = s;  
} while(*s++);  
return(r);  
}  

7. The following segment of code is supposed to print the number of times the routine a_again is called. Yet, regardless of the input, it prints 0. Why? How would you fix it?

```c
void a_again(int acount)  
{
    ++acount;
}

void main(void)  
{
    register int c;
    int counter = 0;

    while((c = getchar()) != EOF)  
        if (c == 'a' || c == 'A')  
            a_again(counter);  

    printf("%d\n", counter);  
    exit(0);
}
```