

2) (10 pts) ANL (Summations and Algorithm Analysis)

Give the Big-Oh runtimes for each of the following functions in terms of n and/or k (where k is the length of string s), given that $strlen(s)$ is an $O(k)$ function and $toupper(c)$ is an $O(1)$ function. You may assume that s is non-NULL and contains at least one character. No justifications necessary, only answers will be graded.

```
void uppercase(char *s)
{
    int i;
    for (i = 0; i < strlen(s); i++)
        s[i] = toupper(i);
}
```

uppercase run time: _____

```
void uppercase_remix(char *s)
{
    int i, length = strlen(s);
    for (i = 0; i < length; i++)
        s[i] = toupper(i);
}
```

uppercase_remix run time: _____

```
void uppercase_unreliable(char *s)
{
    int i = 0, j = strlen(s) - 1, m;

    while (i <= j)
    {
        m = i + (j - i) / 2;
        if (rand() % 2 == 0)
        {
            s[i] = toupper(s[i]);
            i = m + 1;
        }
        else
        {
            s[j] = toupper(s[j]);
            j = m - 1;
        }
    }
}
```

uppercase_unreliable run time: _____

```
void mad_scramble(char *s, int n)
{
    int i;
    for (i = 0; i < n; i++)
        s[strlen(s) - 1] = rand() % 25 + 'a';
}
```

mad_scramble run time: _____