

ISU Programming Assessment, Nov 09, 2018

Name: _____ CS class _____

Put all answers in boxes. Nothing you write outside the boxes will be counted. Did you bring an eraser?

1. Write a program that gets an integer, **n**, from the user and then prints **n** repetitions of the pattern: some X's then some 0's. The first pattern, (**pattern 1**), has one X then one 0. Let **p** stand for 2, 3, or higher. The **p**-th pattern (**pattern p**) has **p** more X's and one more 0 than the pattern before it.

Example: if n=3, then the program will print X0XXX00XXXXXXX000

```
int main(int argc, char *argv[]) {
```

```
    return 0;
}
```

2. **Get input a character at a time.** Write a program that counts the total number of sequences consisting of a period, then a newline, then a second newline (.\n\n). It should print out the only the final count.

```
int main(int argc, char *argv[]) {
```

```
    return 0;
}
```

3. Write the function `square` that is passed the address of the first node of the list. The function replaces the data in each node with its square.

```
typedef struct NODE {
    int data;
    struct NODE *next;
} node_t;

int square(node_t *curr) {
```

```
}
```

4. A BST is constructed in the usual way using the node definition below. Write the function `void rotate( bst_node_t *curr)` that is passed a pointer to the node containing A. **See the picture on the next page.** It changes some pointers to make the BST correspond to the AFTER picture.

```
typedef struct BST_NODE_T {
    int data;
    struct BST_NODE_T *left, *right;
} bst_node_t;
```

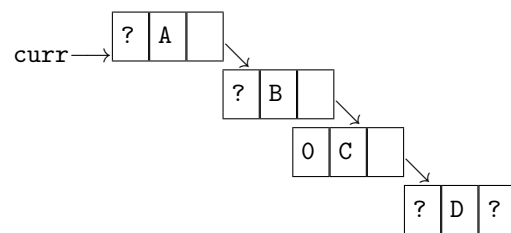
5. Write the function

```
int count1(int n)
```

where **n** is a 32-bit int. The function counts and returns the number of 1 bits in **n**.

Problem 4 pictures:

BEFORE:



AFTER:

