

ISU Programming Assessment, Dec 01, 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 **E**'s, then some **O**'s. The first pattern, (**pattern 1**), has **n** **X**'s then one **E** and one **O**. Let **p** stand for 2, 3, or higher. The **p**-th pattern (**pattern p**) changes from the previous pattern: it has one fewer **X** and either one more **E** if **p** is even or one more **O** if **p** is odd.

Example: if **n=4**, then the program will print **XXXXEOXXEEOXXEEOOXXXXEO**

```
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 comma, then a space. It should print out the only the final count.

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

```
    return 0;
}
```

3. Write the function **average** that is passed the address of the first node of the list. The function finds and returns the average of the values in the list.

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

int average(node_t *curr) {
```

```
}
```

4. A BST is constructed in the usual way using the node definition below. Write the function `int child2( bst_node_t *curr)` that returns the number of nodes having 2 children.

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

5. Write the function

```
int count1011(int n)
```

where **n** is a 32-bit int. The function counts and returns the number of 1011 sequences in **n**. **Example:** the 8-bit string “01011011” contains 2 1011 sequences.