ISU Programming Assessment, February 23, 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 C program that gets a number, `n`, from the user. The program will print `n` lines. Each line consist of `A`'s and `B`'s for a combined total of `n` characters. The first line will have only one `A`. Each new line will have one more `A` and one fewer `B`. Example: n=3

```
ABB
AAB
AAA
```

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

```
  return 0;
}
```

2. Write a C program that reads from stdin one 8-bit character at a time ($b_7b_6b_5b_4b_3b_2b_1b_0$) and counts all the characters where $b_3 == 1$. It should print just one number, the final count.

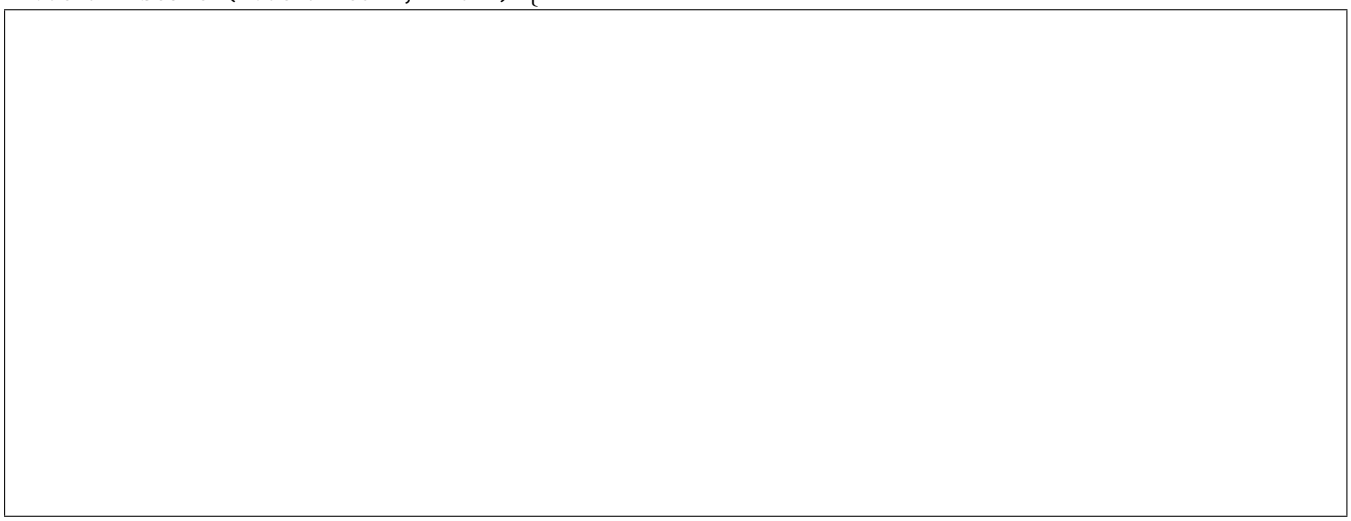
```
int main(int argc, char *argv[]) {
```

```
  return 0;
}
```

3. Write the function `search` that is passed the address of the first node of the list and an integer `n`. It returns the address of the node that contains the value `n` or 0 (NULL) if no node contains `n`.

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

node_t  *search(node_t *curr, int n) {
```



```
}
```

4. A BST is constructed in the usual way using the node definition below. Write a function

`void LStraverse(bst_node_t *curr)`

that prints the data from the largest to the smallest in the nodes of the sub–tree with root `*curr`.

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

5. Write the function `int palindrome(int n)` that returns a 0 or a 1. It returns a 1 **only if** the 32 bits of `n` read the same backwards or forwards. A 8-bit example of a palindrome is `11011011`.