# ISU Programming Assessment, Oct 30 2017

Name: _____ CS class account: _____

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

1. Write a C program that prints the values of each of 1!, 2!, 3!, 4!, … 12! Where ! is defined so that 1! = 1, 2! = 2, 3! = 1*2*3, and in general k! = 1*2*3*...*k

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



```
  return 0;
}
```

2. Write a C program that reads from stdin and prints the first 3 lines read, then …, and then the total number of lines in the input.

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



```
  return 0;
}
```

3. Write a loop that computes the average value of `data` in a linked list, and also computes the number of `data` items that are greater than, equal to, and less than 100. Use the types and variables declared below.

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

int main(int argc, char *argv[]) {
  node_t *head, *ptr;
  /* Assume that the list is somehow created here. */
```

```
  return 0;
}
```

4. Write a function named `total` that has the root of a binary tree as parameter, and which returns the number of nodes in the binary tree that have non-NULL `word`. Use the following type declaration.

```
typedef struct BST_NODE_T {
  char * word;
  struct BST_NODE_T *left, *right;
} bst_node_t;
```

5. Write a C function named `howBig` that takes an `int` as parameter and returns how many bits are needed to store the number in binary. `howBig(15)` would return 4, `howBig(30)` would return 5, and `howBig(260)` would return 9.