ISU Programming Assessment, Dec 6, 2017

Name: _____   CS class (and class account if you have one): _____

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 uses loops to print a countdown: 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 9/10, 8/10, 7/10/ 6/10/ 5/10, 4/10, 3/10, 2/10, 1/10, 0!. *But print each number in the countdown on its own line.*

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



```
   return 0;
}
```

2. Write a C program that reads a file from stdin one character at a time and prints to the screen only letters and whitespace (punctuation and digits are not printed).

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



```
   return 0;
}
```

3. Write a loop that determines if the linked list is in sorted order (repeats are allowed), and prints "sorted" or "not sorted". Use the following type declaration.

```c
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. */
```



```c
  return 0;
}
```

4. Write a function named `allTheSame` that has the root of a binary tree as parameter and returns 1 if every node in the tree has the same value, and returns 0 otherwise. Use the following type declaration.

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

5. Write a C function named named `howMany` that takes an `unsigned int` as parameter and computes how many bytes in the integer are not 0 (out of a total of `sizeof(int)`). Remember that each byte is two hexadecimal digits. On input 0x1 the function would output 1, on input 0x10e0 (4320 in decimal) the function would output 2, on input 0x12345 (74565 in decimal) the function would output 3.