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 the following: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100! *But print each number on its own line.*

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

```




















```

```
   return 0;
}
```

2. Write a C program that reads from stdin one character at a time and prints the following modification of the characters that are read - all '.' characters are printed as '!', letters are printed as upper case, and all other characters are printed as is. The string "hello there, good sir." would be printed as "HELLO THERE, GOOD SIR!"

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

```


















```

```
   return 0;
}
```

3. Write a loop that prints every other item in the linked list. Use the following type declaration. If the list contained 5, 10, 3, 2, 4, 20, then you would print 5, 3, 4.

```
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 `allDifferent` that has the root of a binary tree as parameter and returns 1 if there are no repeats in the tree (no two nodes with the same data value), and returns 0 otherwise. Use the following type declaration. You should assume the BST is in proper order.

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

5. Write a C function named named `base16` that takes an `unsigned int` as parameter and prints the base 16 formula for the number. On input 42 (which is 2a in hex), it would print 2 * 16 + 15 * 1. On input 91 (which is 5b in hex), it would print 5 * 16 + 11 * 1. On input 1000000 (which is f4240 in hex), it would print 15 * 65536 + 4 * 4096 + 2 * 256 + 4 * 16 + 0 * 1