

UMass Boston CS 240 Test 1

June 15, 2020

Name: _____ Student Number: _____

Instructions

1. **Turn off all digital devices.**
2. One cheat sheet of your own is allowed.
3. Data type storage specification is on first page.
4. Precedence, ASCII and printf reference table are allowed.

Data Type Specification

- char: 1 byte
- int: 4 bytes
- short: 2 bytes
- long: 8 bytes
- long long: 8 bytes
- float: 4 bytes
- double: 8 bytes
- signed int: is int
- unsigned int: or just unsigned

1. (a) Which of the following identifiers are valid C variable names? (5 Points)
 - i. `continue`
 - ii. `finished!`
 - iii. `num`
 - iv. `year-2018`
 - v. `__letMeThink`
- (b) You have two C source code files within current directory, **test1.c** and **client.c** which `client.c` utilizes some functions defined in `test1.c`. Write a rule for makefile to compile these two C source files into an executable file **client**. (5 Points)

2. (a) (10 points)

What would be binary format for the an integer variable **i=-4** in C in the memory ? Show the key steps.

(b) (10 points) Given a string parameter, the following function changes all upper case letters to lower case, and all lower case letters to upper case. Write code to complete the function.

```
void flipCases(char str[]) {
    int i;

    for (i = 0; str[i] != '\0'; i++) {
        if (str[i] < 'a') //is str[i] upper case?
            str[i] = str[i] + 32; //change to lower case
        else if (str[i] > 'z') //is str[i] lower case?
            str[i] = str[i] - 32; //change to upper case
    }
}
```

3. (20 points)

```
unsigned char beagle = 0x1F;  
unsigned char pug = 0x44;  
char puggle = beagle << 1 < 32 || pug < 25 / 2 << 2;
```

(a) (10 points) Fully parenthesize this expression to reflect the precedence.

```
beagle << 1 < 32 || pug < 25 / 2 << 2
```

4. (10 points) Write a function `int binary` that rotates `s` to the right by `n` times in place. Write code clearly.
For example: Rotate "are" to the right by 5 times gives "rea";

5. (20 points) Quinary (base-5, pental) numbers.
- (a) (5 points) Convert the decimal number 286_{10} to quinary.
 - (b) (5 points) Convert the quinary number 314_5 to decimal.
 - (c) (10 points) Convert 127.4375_{10} to binary. Maximum 8 fraction bits without rounding.
Show your work.

6. (20 points) Write a program to read from `stdin` line by line, and for each line, remove its trailing blanks and tabs and delete entirely blank lines, then print out the modified line onto screen. Suppose the maximum number of characters of each line is 100.

Note: Write neatly.

```
#include<stdio.h>
#define MAXLINE 100
```

```
int main(void)
{
```