CSCI1121 **Spring 2018**

Problems to solve 3 consists of 15 problems for practicing functions in preparation for the midterm examination.

1. Write two functions that take an integer parameter and return the square and the cube of this number, correspondingly. Write a C program that reads an integer and uses the functions to display the sum of the number's square and cube.

2. Write a function that takes as parameters three values and returns the minimum of them. Write a C program that reads the grades of three students and uses the function to display the minimum.

3. Write a function that takes as parameter a character and uses the switch statement to return the same character if it is 'a', 'b' or 'c', otherwise the character 'z'. Write a C program that reads a character, calls the function, and displays the return value.

4. Write a function that takes as parameters three floats and returns the average of those within [1,2]. Write a C program that reads three floats, calls the function, and displays the return value.

5. Explain in words what is the output of the following program?

```
#include <stdio.h>
void test(int *pt1, int *pt2);
int main(void)  {
   int n = 10, m = 20;
   test(&n, &m);
   printf(" %d %d\n", n, m);
   return 0; }
void test(int *pt1, int *pt2)  {
   int z, *tmp;
   tmp = pt1;
   pt1 = &z;
   *pt1 = 100;
   *pt2 += z;
   pt2 = tmp;
  *pt2 = 100;  }
```

6. Write a function that takes an integer parameter (e.g., n) and returns the result of $1^3 + 2^3 + 3^3 + ... + n^3$. Write a C program that reads a positive integer up to1000 and uses the function to display the result of the expression.

7. Write a function that takes as parameters two pointers to floats and swaps the values they point to. Write a C program that reads two floats and uses the function to swap them.

8. Write the `power(double a, int b);` function that returns the result of a^b. Write a C program that reads a float number (e.g., a) and an integer (e.g., b) and uses the function to display the result of a^b.

9 .Write a void function that generates a random number from 0 to 1 with two decimal digits and uses a proper parameter to return it. Write a C program that calls the function and displays the return value.

10. Write a function that takes as parameters an array containing the students' grades in a test and two grades (e.g., a and b) and returns the average of the grades within [a, b]. Write a C program that reads the grades of 50 students and the two grades a and b and uses the function to display the average. The C program is to ask the user to enter a value for a less than or equal to b.

11. Write a function that takes as parameter a string and returns its length. Do not use `strlen().`

12. What is the purpose of the following function?

```
unsigned int exam(const char *st) {
const char *pt = st;
while(*st++) //Similar to while(*str++ != '\0').
        ;
return st-pt-1; }
```

13. Write a function that takes as parameters two strings and returns a pointer to the longer string. If the strings have the same number of characters, it should return NULL. Write a C program that reads two strings of less than 100 characters and uses the function to display the longer one.

14. Write a function that takes as parameters two strings and uses them as pointers to copy the second one into the first one. Do not use the function `strcpy().` Write a C program that reads two strings of less than 50 characters and uses the function to swap them and display their content.

15. Write a function that takes as parameters two strings and returns 1 if the second string is contained at the end of the first one. Otherwise, it should return 0. Write a C program that reads two strings of less than 50 characters and uses the function to check whether the second string is contained at the end of the first one or not.