# Spring 2018, MIS 102 – COMPUTER PROGRAMMING

## Midterm Exam

姓名：_____ 學號：_____ 系級：_____

**Part Ⅱ [80 pts]**

**1. [10 pts]** Please write a C recursive function *reverse*(*string*) that prints reversed string of a given string. For example, *reverse*("string") would print "gnirts". Please DO NOT use any C string manipulation functions.

**2. [20 pts]** Please write a C program that finds prime numbers between two positive integer number entered by users.

The following is a sample output:

```
Enter two numbers (intervals): 20
50
Prime numbers between 20 and 50 are: 23 29 31 37 41 43 47

Enter two numbers (intervals): 50
20
Prime numbers between 20 and 50 are: 23 29 31 37 41 43 47
```

**3. [20 pts]** Please write a C function *listSumOfTwoSqrt(z)* that determines whether *z* can be expressed as the sum of two squares, as:

$$z = x^2 + y^2$$

where $z > 0$, $x > 0$, $y > 0$, and $x \neq y$. Note that *z*, *x*, *y* are all positive integers. Please print all possible combinations. If not found, print a message "Not found!". For example,

*listSumOfTwoSqrt(170)*

will print

```
x = 1, y = 13. 1^2 + 13^2 = 170
x = 7, y = 11. 7^2 + 11^2 = 170
```

*listSumOfTwoSqrt(997)*

will print

```
x = 6, y = 31. 6^2 + 31^2 = 997
```

*listSumOfTwoSqrt(165)*

will print

```
Not Found!
```

**4.[10 pts]** Please write a C function *concat*(*str1*, *str2*, *out*) that concatenates two given strings, *str1* and *str2*, and store the result into the new variable out. For example,

```
concat(“hand”, “some”, out);
```

will replace the variable *out* with “handsome”. Please DO NOT to use any string manipulation functions in C Standard Library. (Hint: use C pointer or array)

**5. [20 pts]** Please write a C function *wordOccurCount*(*inputStr*, *word*) that counts the number of occurrences of a string *word* in a given string *inputStr*. For example, the following C program that uses your function:

```
int main(void) {
    char str[] = "I'm a student. You're a student. We are all students!";
    printf("\"%s\" occurs %d times in the string. \n",
                "student", wordOccurCount(str, "student") );
}
```

will output:

```
"student" occurs 3 times in the string.
```

You may use any character/string manipulation functions in C Standard library.