Sichuan University Final Examination

(Open Book and Open Notes)

(2019-2020 Academic Year 2nd Semester)

课程号 Course Number: 304134010　　课程名称 Course Title: Computational Thinking

任课教师 Lecturer:　　考试时间 Time Period:

学生姓名 Name:　　学号 Student ID:　　成绩 Total Mark:

考 生 承 诺

Student Commitment

我已认真阅读并知晓《四川大学考场规则》和《四川大学本科学生考试违纪作弊处分规定（修订）》，郑重承诺：

I have read and comprehended the "Regulations of Sichuan University on Examinations". I give my commitments as follows:

1、已按要求将考试禁止携带的文具用品或与考试有关的物品放置在指定地点；

1. I have put prohibited stationary and exam-related items at designated area as required.

2、不带手机进入考场；

2. I have not brought cell phone to the examination room.

3、考试期间遵守以上两项规定，若有违规行为，同意按照有关条款接受处理。

3. During the examination, I will comply with the above two provisions. If there is any violation, I agree to accept the punishments in accordance with the relevant provisions.

考生签名：

Signature:

评阅教师	得分

问题 1：输出一个字符串的所有无重复排列组合。请详细描述解题过程并写出代码。(25 分)

示例：输入：S＝"qwe"　　输出：["qwe", "qew", "wqe", "weq", "ewq", "eqw"]

评阅教师	得分

问题 2：设计一个感知机来区分香蕉和菠萝：(25 分)

$$\mathbf{p}_1 = \begin{bmatrix} -1 \\ 1 \\ -1 \end{bmatrix} \text{(Banana)}$$

$$\mathbf{p}_2 = \begin{bmatrix} -1 \\ -1 \\ 1 \end{bmatrix} \text{(Pineapple)}$$

评阅教师	得分

问题 3: 对以下数字排序，35, 16, 49, 11, 7, 68, 17。请详细描述排序过程并写出代码。任意排序方法都可使用。 (25 分)

评阅教师	得分

Problem 4: Describe how Genetic Algorithm (GA) works. Please also give an example of Multiobjective Optimization Problem in your daily life. The example should include at least two elements: objectives and decision variables.
(25 points)