

# Assignment Two

**SOFE 3770U: Design and Analysis of Algorithms, Fall 2018**

**Dr. Sukhwant Kaur**

**Submission Deadline: Tuesday, Nov13, 2018, 11:59 PM**

## Submission Guidelines

**One submission per group and no more than two students per group, please.**

<b>Student Number</b>	<b>Banner id</b>	<b>Student Name</b>
<b>1.</b>		
<b>2.</b>		

**As one PDF file, in your report, you need to submit**

- a) Your algorithm description in pseudo-code,**
- b) Big-O analysis,**
- c) Code,**
- d) output results**

**In your report, would you please mention your system's specifications (i.e., Hardware, Operating System, Compiler, Programming language).**

**Note:**

- a. Late submissions or submissions in email will not be accepted.**

- 1) **Expedition(50marks):** A group of people is planning an expedition. For safety, they decide to split into two groups; it does not matter how many people are in each group. Not all of them are good friends, and one reason for splitting is to separate all pairs that are not friendly to each other. Your goal is to design and implement an algorithm that, given the map of friendship relations between people in the group, would find a partition of people into two groups of friends, or say that it is impossible. Assume that the input is an  $n \times n$  matrix  $M$ , where  $n$  is the number of people in the group and  $M(i, j) = 1$  if  $i$  and  $j$  are friends, and 0 otherwise. Also, if  $i$  is friendly to  $j$ , then  $j$  is friendly to  $i$ . Your output should be the sequence of numbers corresponding to people assigned to the first group.
  
- 2) A department has five employees with five jobs to be performed. The time (in hours) each men will take to perform each job is given in the effectiveness matrix. How should the jobs be allocated, one per employee, so as to minimize the total man-hours? **-50 marks**

	Employees					
		I	II	III	IV	V
Jobs	A	10	5	13	15	16
	B	3	9	18	13	6
	C	10	7	2	2	2
	D	7	11	9	7	12
	E	7	9	10	4	12

### Assignment Two: Marking Scheme

**For each of the Question:**

- A) Algorithm description in pseudo-code: 15%**
- B) Big-O analysis: 15%**
- C) Algorithm correctness and output results: 70%**

**Total mark: 100%**