

Name: \_\_\_\_\_

## CSCI 380: Activity 1

### Group Roles and Set Theory Review<sup>1</sup>

#### Learning Objectives

1. Become more comfortable working the various roles within their group.
2. Learn how to work with others.
3. Review set theory notation and concepts.



You will be rotating through assigned groups for your in-class activities and group presentations over the course of the semester. For these activities, you will begin by picking up the POGIL role cards, along with the activity worksheet for the day. You will then work with your assigned group to complete the tasks, to the best of your ability within the role assigned. It is important that you attend class so that you can earn POGIL participation credit. In the event of an excused absence, individual completion of the exercise is required. **If you do not communicate with me before your absence, it will be unexcused unless in case of emergency.** Unexcused absences cannot complete POGIL exercises.

In this Activity, you will find two **Modules** and one **Reflection** section.

#### Note

Group work will be a large component of this class. You will work better with people if you know a little about each other. Introduce yourselves to your group, and make sure you will remember everyone's names.

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<sup>1</sup>content derived from CS-POGIL Discrete Structures exercises by Jim Van Horn. <https://cspogil.org/>

start time
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### Model I. Group Roles (10min)

Look at the Role Cards. On one side is a role name, description of that role, and a list of process skills that will be practiced during this course.

## Critical Thinking Questions

1. List the names of the four roles that are on the cards on your desk.
2. Assign each person in your group one of the role cards. If you have 3 people, combine Facilitator & Process Analyst.

Team Roles	Team Member
Facilitator	
Spokesperson	
Quality Control	
Process Analyst	

3. Once you have assigned roles, each person needs to read the job description on their role. Each person in your group should share a **summary** of the job description on the role card that you have with your group.

4. Match the roles with their responsibilities.

#### Facilitator

Records all answers & questions, and provides team reflection to team & instructor.

#### Spokesperson

Considers how the team could work and learn more effectively.

#### Quality Control

Reads the questions aloud, keeps track of time and makes sure everyone contributes appropriately

#### Process Analyst

Talks to the instructor and other teams.

5. For each role, give an example of how someone observing your group would know that a person is doing their job well.

- Facilitator
- Spokesperson
- Quality Control
- Process Analyst

### STOP

Before going further, remove the last page of this Activity and tear off and give each person the portion of the Group Reflection that pertains to their role. They will need to keep these questions in mind as you work together as a team.

start  
time

### Model II. Set Theory Review (20 min)

A *set* is an **unordered** collection of **unique** objects.

- The objects in a set are called the *elements*, or *members* of the set. A set is said to *contain* its elements.
- A set can be described by listing all its elements in a *roster*.

$$S = \{a, b, c, d\}$$

- Order is *not important*.

$$S = \{a, b, c, d\} = \{b, c, a, d\}$$

- Often it is more convenient to describe a set by specifying the property or properties that all members must satisfy:

$$S = \{x : x \text{ is a positive integer less than } 100\}$$

- The set of all odd positive integers less than 10 can be described using *set-builder* notation:

$$S = \{x \in \mathbb{Z}^+ : x \bmod 2 = 1 \text{ and } x < 10\}$$



1. Match the following names with the set notation symbols we will be using in this class. Note that this notation might not match those you learned in your previous course work, each course uses slightly different symbols.

empty set	$ S $
not an element	$2^S$
powerset	$x \in S$
cardinality	$\subseteq$
difference	$S \times R$
intersection	$\emptyset$
Cartesian product	$S - R$
proper subset	$x \notin S$
union	$S \cap R$
element	$\overline{S}$
complement	$\subset$
subset	$S \cup R$



Wait for all teams to complete this exercise.

2. Your homework in this class will be written in Typst. Each member of your team should create an account on <https://typst.app>, or download the *TinyMist* extension for *Visual Studio Code*.
3. Make a new document, listing your group names at the top.
4. Write the following formulas, first their meaning in English, and then with symbols. Please use <https://typst.app/docs/reference/symbols/sym/> for constructing your documents.

a.  $\overline{S_1 \cup S_2} = \overline{S_1} \cap \overline{S_2}$

b.  $S_1 = S_2 \iff (S_1 \cap \overline{S_2}) \cup (\overline{S_1} \cap S_2) = \emptyset$

c.  $(\forall A, B \in P) A \neq B \Rightarrow A \cap B = \emptyset.$

d.  $(Q, \Sigma, \delta, q_0, F)$

e.  $\delta : Q \times \Sigma \rightarrow Q$

**Looking Back - Group Reflection**

During the Group Reflection time you will often be asked to evaluate your effectiveness in your assigned role and your process skills. For each of these assessments use the **SII framework**:

**S** – Strength

**I** – Improvement Area

**I** – Insight you gained about the process

**Facilitator**

Review the job descriptions on your role card. Evaluate privately how well you performed in your role using the SII framework. You do not need to share your answer.

List below how long each Model took your group:

- Model I:
  - Model II:
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**Process Analyst**

Give feedback to each of your other team members with a **strength** that you observed, either in their role or their process skills.

Provide an overall TEAM assessment of today's activity.

1. Describe at least one strength and explain WHY it is a strength.
  2. Describe at least one area for improvement and HOW you might achieve that improvement
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**Quality Control**

Review the job descriptions on your role card. Evaluate privately how well you performed in your role using the **SII framework**. You do not need to share your answer.

Summarize the activity for your group members, by answering the following two questions.

1. Were there any symbols that were unfamiliar to your group?
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**Spokesperson**

Review the job descriptions on your role card. Evaluate privately how well you performed in your role using the SII framework. You do not need to share your answer.

Gather up the whiteboard, name cards, and any other materials and place them on the back table.