

# Assignment #4

IE5351 Introduction  
to Systems  
Engineering

## Team II Members

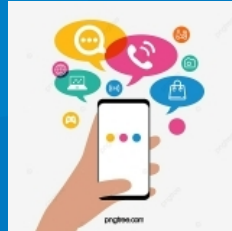
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# TASK:

- Develop a detailed context diagram for a cell phone system with a supporting data dictionary that includes a brief definition of each source, sink, input and output. Justify the context for your system.
- Develop an N2 diagram for a cell phone system using the entities from your context diagram. Provide a supporting data dictionary that includes a brief explanation of each of the elements of the diagram.

## Part I

# Context Diagram

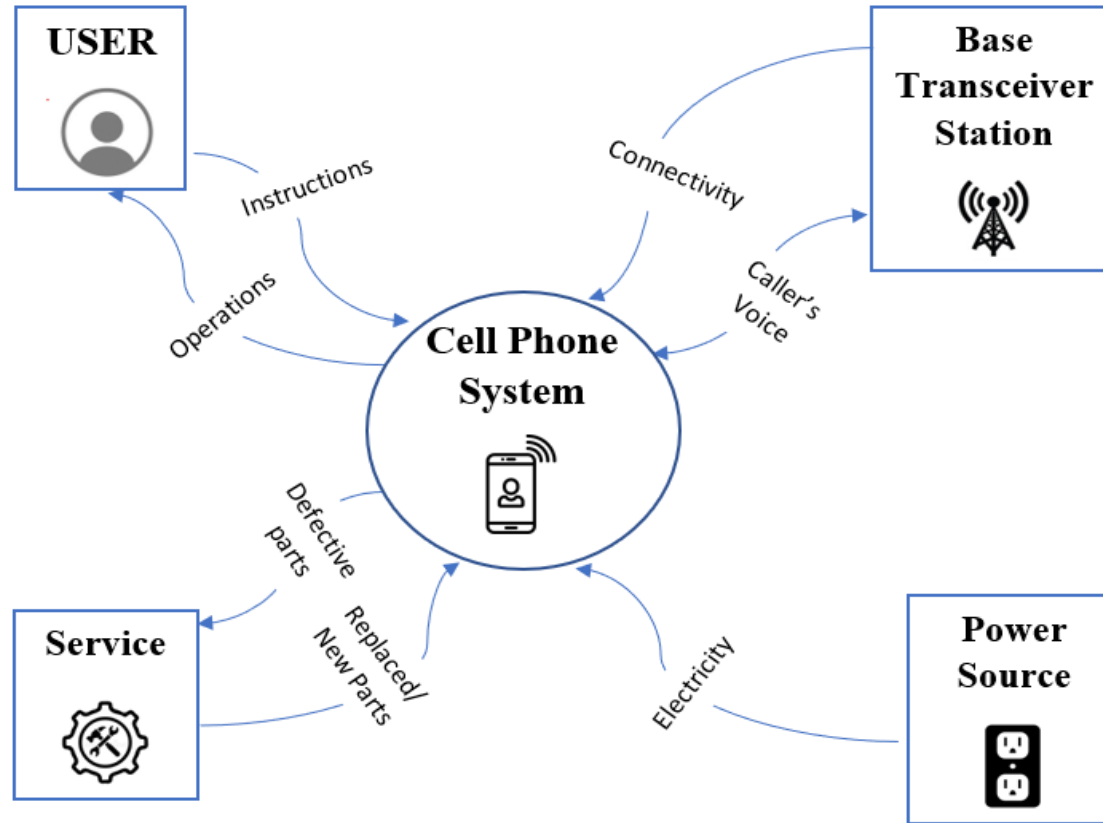


# Definitions

## Context Diagram

Top-level diagram of a Data Flow Diagram that is related to a specific level of system decomposition. This diagram portrays all inputs and outputs of a system but shows no decomposition.

# Context Diagram



## Part II

# N2 Diagram

# Definitions

## N2 Diagram

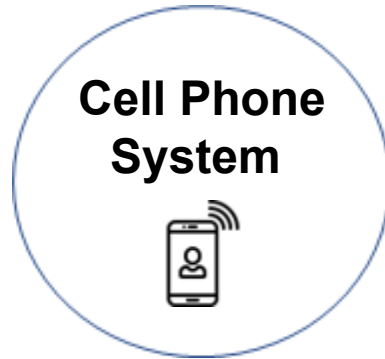
A systematic approach to analyze interfaces. These apply to system interfaces, equipment (e.g., hardware) interfaces, or software interfaces. N2 diagrams can also be used at later stages of the development process to analyze and document physical interfaces between system elements

## N2 Diagram

<b>Cell Phone System</b>	Operations	Defective Parts		Caller's Voice
Instructions	<b>User</b>	Money		
Replaced/ New Parts	Receipt	<b>Service</b>		
Electricity			<b>Power Source</b>	
Callie's Voice/ Connectivity				<b>Base Transceiver Station</b>



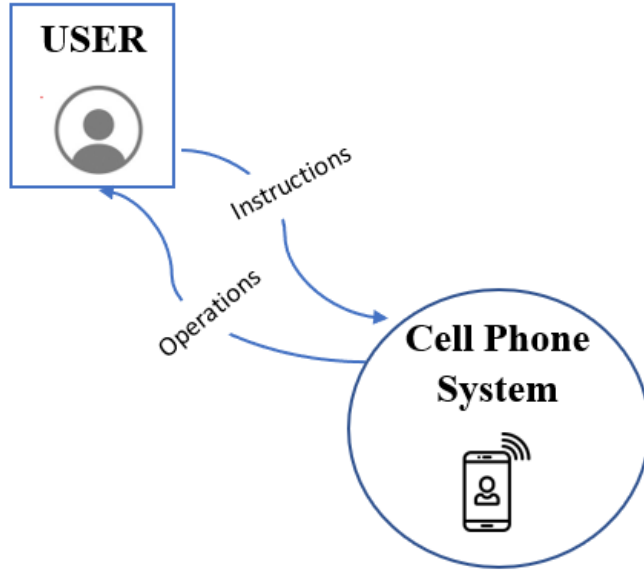
# Data Dictionary



## Cell Phone System

Cell phone system is the set of software and hardware parts with the properties of making and receiving calls emerging as a result from their interactions.

# Data Dictionary



## User

An individual who or group that benefits from a system during its utilization

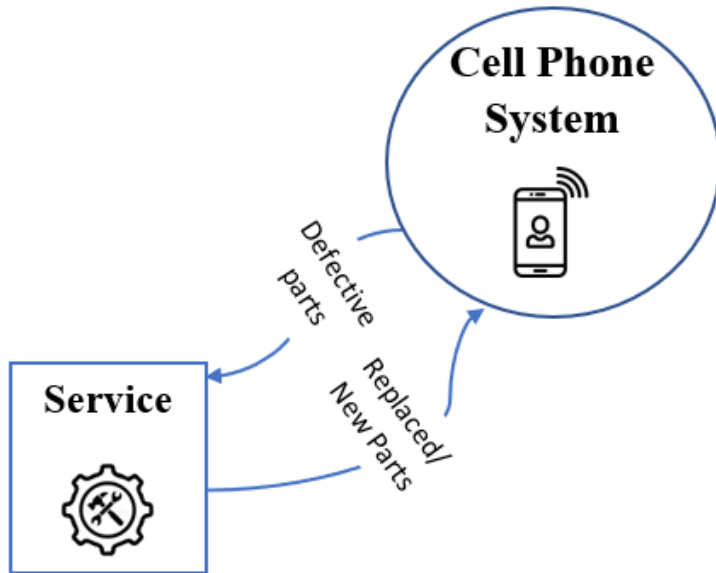
## ➡ Input

The user interacts or provides the instructions to the system via the touch interface, physical button, voice, and other input methods that the cell phone has.

## ☐ Output

The user can receive or check the status of his instructions.

# Data Dictionary



## Service

A group or an individual who can provide repair, maintenance, and replacement of faulty parts to restore the original functionality of the system.

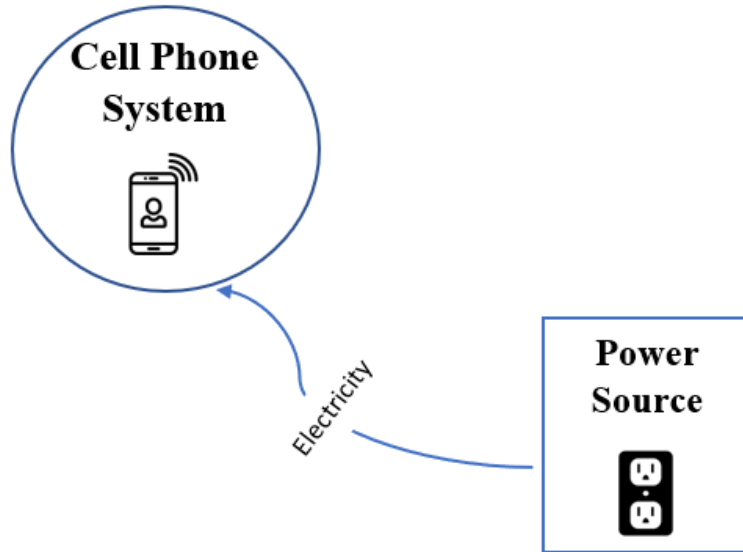
### ➡ Input

Service provider provides maintenance and repair.

### Output

Service provider might replace parts or faulty components to improve or restore the functionality of the cell phone.

# Data Dictionary



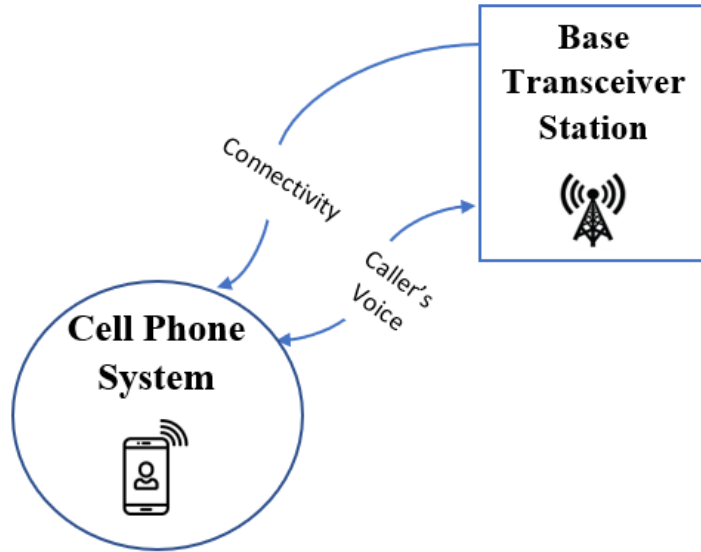
## Power Source

A source of energy used to power electric circuitry and recharge battery.

## ➡ Input

Power source charges the battery, which in turn powers the components in the cell phone.

# Data Dictionary



## Transceiver Station

Base Transceiver Station serves as a central connection point for wireless mobile devices to communicate.

### ➡ **Input**

Base station relays back the voice of the callee and provides cellular connectivity to the cell phone.

### ❑ **Output**

Base station receives the information of the callee and encoded voice of the caller from the cell phone.

# References

- Whalen, J., Wray, R., & McKinney, D. (2004). In Systems engineering handbook: A "what to" guide for all SE practitioners (p. 126). INCOSE.
- Walden, D. D., Roedler, G. J., Forsberg, K., Hamelin, R. D., & Shortell, T. M. (2015). Systems engineering handbook: A guide for system life cycle processes and activities (pp. 68). Wiley.
- Wright, G. (2021, March 4). What is a base station? WhatIs.com. Retrieved September 11, 2022, from [www.techtarget.com/whatis/definition/base-station](http://www.techtarget.com/whatis/definition/base-station)