# Laboratory Exercise 4: Prisoner’s Dilemma

## Introduction

The prisoner's dilemma is a game analyzed in game theory. It is a thought experiment that challenges two completely rational agents to a dilemma: they can cooperate with their partner for mutual benefit or betray their partner ("defect") for individual reward. This dilemma was originally framed by Merrill Flood and Melvin Dresher in 1950 while they worked at RAND.[citation needed] Albert W. Tucker later formalized the game by structuring the rewards in terms of prison sentences and named it "prisoner's dilemma".

Two prisoners are separated into individual rooms and cannot communicate with each other. The normal game is shown below:

| **Prisoner B**<br>**Prisoner A** | **Prisoner B stays silent (*cooperates*)** | **Prisoner B betrays (*defects*)** |
|---|---|---|
| **Prisoner A stays silent (*cooperates*)** | Each serve 2 years | Prisoner A: 10 years<br>Prisoner B: goes free |
| **Prisoner A betrays (*defects*)** | Prisoner A: goes free<br>Prisoner B: 10 years | Each serve 5 years |

It is assumed that both prisoners understand the nature of the game, have no loyalty to each other and will have no opportunity for retribution or reward outside of the game. (see more at [Prisoner's dilemma - Wikipedia])

## Learning Outcomes:

- Implement an assembly code to accept user input and display the output
- Implement a logical solution in assembly language for prisoner’s dilemma.

## Implementation Guide:

Display a guide for the user to perform input.

Ask users (Prisoner A and Prisoner B) character input without keyboard echo. For cooperate the input would be (C) and defect (D). Restrict the input so that only the 2 characters (i.e. C and D) would be the valid input. This means that when an invalid input is made, it would repeatedly ask for a valid input from the user for the specific prisoner.

Display the result of the based on the logical guide indicated on the table above.

Ask the user if the process would be repeated all over again.

Sample output:

```
Prisoner A:

Prisoner B:

Each serve 2 years

Try Again? [Y/N]
```