

CS 150 - 01
Programming Assignment #2
The Prisoner's Dilemma

Date Assigned: Monday, September 22, 2008

Design Documents: Friday, September 27, 2008 1 pm (5 points)

Date Due: Wednesday, October 1, 2008 1 pm (25 points)

Total Points: 30 pts

This classic conundrum has been a staple of game-theory, computer science and philosophy for many years. It is based on a hypothetical situation in which two people have been accused of a crime. Before their arrest, they have agreed to cooperate with each other and not give evidence against each other. However, In order to get each to give evidence against the other, the prosecutor has given them incentives. If neither gives evidence (they cooperate with one another), then both will get a prison sentence of 4 years. If one gives evidence against the other (i.e. he/she defects) while the other refuses to give evidence (cooperates), the one who defects goes free while the other gets 10 years in prison. If both give evidence against each other, they both get 8 years in prison¹.

For your simulation, you are to ask the user to input the choice of each of the people accused of the crime. The user will input **c** or **C** if the accused chooses to remain silent and cooperate with the other accused. The user will input **d** or **D** if the accused chooses to defect and betray the other accused. If the user inputs anything else, then your program should exit.

Based on the input of both people accused of the crime, you should display their respective sentences.

Sample input and output

```
*****
|           The Prisoner's Dilemma           |
*****

Enter the first accused person's name: John
Enter the first accused person's choice: C

Enter the second accused person's name: Elizabeth
Enter the second accused person's choice: C

      NAME      PRISON TERM
-----
      John      4 Years
Elizabeth      4 Years
```

¹ For more information on The Prisoner's Dilemma, visit http://en.wikipedia.org/wiki/Prisoner's_dilemma

Submit an electronic copy of your design document

Before you start you need to think about the data in your program and the calculations you will need to perform. Answer the following questions in a GoogleDoc (named 02ProgramDesignPUNetID) and share it with the instructor (ShereenKhoja@gmail.com). Be sure to answer the questions in complete sentences where appropriate. This design document is due on **Friday at 1 pm**.

Design Questions:

1. What data will you need to store for this program, and what are their data types?
2. What logical and/or relational expressions will you need to use in your program?
3. What decision statements will you need to use in your program?
4. What operations will need to be protected by the decision statements from 3?

To complete this assignment you must

1. Create a new C++ project in Visual Studio. Name your project **02Prisonerxxxxxxx**, where xxxxxxxx should be replaced by your PUNetID. As an example, my project would be called "02Prisonerkhaj0332". It is vital that you name your project correctly!
2. Type the solution (**fully documented/commented**) to the problem into your project.
3. You must follow the coding standards that I have handed to you.
4. Remember to enter in your name as the author of the program.
5. Make sure that your program compiles and runs correctly. If you get any errors, double check that you typed everything correctly. Be aware that C++ is case-sensitive.
6. Once you are sure that the program works correctly it is time to submit your program. You do this by logging on to Turing and placing your complete project folder in the **CS150-01 Drop** folder. Make sure that you copy your program folder and don't move it. If you move it, then you will not have your own copy!

Notes:

1. You must format the output to look like the sample output by using the input/output manipulators.
2. You must use if-statements.

Submitting this project:

To receive full credit for this assignment, your project must be in the drop box by 1 pm on the day that it is due. Anything received after that will be considered late. Further, you must bring a **hard copy** of your program to class and place it on the instructor's desk by 1 pm. You must print out the program in color and staple it if necessary. You also must also submit the **design document by Friday at 1 pm**.

Do not wait until the last minute to print your program!

Remember, this is an individual assignment.

Good luck! And remember, if you have any problems, come and see me straight away.

Also, refer to the syllabus for assignment policies.

START EARLY!!

Good Luck! ☺