



**Faculty of Engineering and Technology**  
**Electrical and Computer Engineering Department**  
*Linux Laboratory, ENCS313*  
Python Project

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### Submission

- Five python scripts (one module for each task and the main script) and any additional scripts for classes in case of Object Oriented Programing.
  - A report including screenshots of the output of your code with proper documentation.
  - Name the pdf file as **xxxxxxx-yyyyyyy-Sec-zz.pdf**  
xxxxxxx : university number  
yyyyyyy : Your first Name  
zz: Section Number
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### Problem Description

A car rental company records all car rentals manually on a text file (“CarRentalOld.txt”). They need to record the following information about each car rental:

- **Name:** Name of the person renting the car (example: Ahmad Omar),
- **Id:** Id number of the person renting the car (example: 802424333),
- **DoB:** Date of birth of the person renting the car (example: 10 April 2000),
- **Mobile:** mobile number of the person renting the car (example: 0550123456),
- **CL:** an alphanumeric value representing the car license number (example: A10B20)
- **CM:** car make (example: Audi),
- **Year:** the year of manufacturing the car (example: 2018),
- **SD:** car rent start date (example: 15 April 2020),
- **ED:** car rent end date (example: 17 April 2020),
- **RB:** the amount the customer paid for this rental (example; 170).

This information is added in separate lines for each car rental with a semicolon as the separator between fields. Here are a few examples:

**Ahmad Omar;802424333;10 April 2000;0550123456;A10B20;Audi;2018;15 April 2020;17 April 2020;350**

**Abeer Islam;801321533;1 March 1999;0440123456;C30B20;BMW;2016;5 February 2019;8 February 2019;370**

The owner of the company finds out that the employees were not accurate in entering this information into the text file. He finds out the following mistakes:

- 1- Dates are input in a different format. He finds out the following two formats dd-mm-yyyy and dd/mm/yyyy. See the following examples:
  - a. **Ahmad Omar;802424333;10-04-2000;0550123456;A10B20;Audi;2018;15-04-2020;17-04-2020;350**
  - b. **Abeer Islam;801321533;01/03/1999;0440123456;C30B20;BMW;2016;05/02/2019;08/02/2019;370**

- 2- Some fields are missing in the database. See the following examples:
  - a. Ahmad Omar;;10 April 2000;0550123456;A10B20;Audi;2018;15 April 2020;17 April 2020;350
  - b. ;801321533;1 March 1999;0440123456;C30B20;;2016;5 February 2019;8 February 2019;370
- 3- Some duplicate entries are added to the database such as:
  - a. Ahmad Omar;802424333;10 April 2000;0550123456;A10B20;Audi;2018;15 April 2020;17 April 2020;350
  - b. ahmad omar;802424333;10 April 2000;0550123456;A10B20;Audi;2018;15 April 2020;17 April 2020;350
  - c. ;802424333;10 April 2000;0550123456;A10B20;Audi;2018;15 April 2020;17 April 2020;350

Another example:

- a. Ahmad Omar;802424333;10-4-2000;0550123456;A10B20;Audi;2018;15 April 2020;17 April 2020;350
- b. Ahmad Omar;802424333;10/4/2000;0550123456;A10B20;Audi;2018;15 April 2020;17 April 2020;350
- c. Ahmad Omar;802424333;;0550123456;A10B20;Audi;2018;15 April 2020;17 April 2020;350

## Tasks:

Write separate python modules for each of the following tasks. Then import and call the modules in the main python script to perform tasks and print output on screen.

**Task #1:** Write a python module to fix the old database. Write a separate function for each of the following:

- 1- Modify the format of the dates in the database (example: 10-4-2000 → 10 April 2000)
- 2- Try to complete the missing information in the database. Then move all not complete entries to a new text file called (“CarRentalMissing.txt”) and the completed entries to a text file called (“CarRentalCompleted.txt”)
- 3- Remove duplicate entries form the completed database.
- 4- Print a statistics summary about the missing fields and the recovered fields in the database.

```
Summary of data missing in the database:
Number of duplicate entries in the database = 30
Number of entries with wrong date format in the database = 12
Number of entries where names are dropped from the database = 15
Number of entries where Ids are dropped from the database = 18
Number of entries where dob are dropped from the database = 23
Number of entries where mobile numbers are dropped from the database = 22
Number of entries where personal entry can not be completed = 44
Number of entries where car make are dropped from the database = 12
Number of entries where car Ids are dropped from the database = 10
Number of entries where car models (year) are dropped from the database = 7
```

```
Summary of data recovered from the database:
Number of duplicate entries removed from the new database = 30
Number of entries with wrong date format fixed in the new database = 12
Number of entries with names recovered in the new database = 15
Number of entries with Ids recovered in the new database = 18
Number of entries with dob recovered in the new database = 23
Number of entries with mobile numbers recovered in the new database = 22
Number of entries with car make recovered in the new database = 12
Number of entries with car models (year) recovered in the new database = 7
Done
```

**Task #2:** Write a python module with proper functions to inquire and print on-screen information from the completed database. The inquiry must be of two types:

- 1- Inquiry about a person using the **Name** or **Id**. Print information about the person and all cars rented by the person. **In this case, print also the amount paid by this person for renting cars.**
- 2- Inquiry about a car using the **CL**. **Print information about the car and all persons rented the car. In this case, print also the revenue made by renting this car.**

**Task #3:** Write a python module to add information for new car rental to the completed database. This should be based on the following:

- 1- Input the rental dates provided by the customer.
- 2- Print on screen the cars available during these dates.
- 3- Add a car and rental information to the completed database.

**Task #4:** Write a python module with proper functions to print on-screen statistics about each car in the completed database. For each car print the following:

- 1- Number of days the car was rented,
- 2- Revenue made by renting the car,
- 3- Average price per day for renting each car.

### Validation of the Python Project:

To validate your project, we prepared few database samples. For each database, we synthesized some errors. These errors are listed next to each database as presented in the table below. Try to use your project to identify these errors (it will be good if you print the number of each error type on the screen) and fix the database (if possible) as described in Task#1. We provide below the table examples for each type of error.

database	nduplicates	ndatechange	ndropnames	ndropids	ndropdob	ndropmobiles	ndroppentry	ndropcmake	ndropcids	ndropcyears
CarRentalOld_0	0	0	0	0	0	0	0	0	0	0
CarRentalOld_1	100	0	0	0	0	0	0	0	0	0
CarRentalOld_2	0	100	0	0	0	0	0	0	0	0
CarRentalOld_3	0	0	100	0	0	0	0	0	0	0
CarRentalOld_4	0	0	0	100	0	0	0	0	0	0
CarRentalOld_5	0	0	0	0	100	0	0	0	0	0
CarRentalOld_6	0	0	0	0	0	100	0	0	0	0
CarRentalOld_7	0	0	0	0	0	0	100	0	0	0
CarRentalOld_8	0	0	0	0	0	0	0	100	0	0
CarRentalOld_9	0	0	0	0	0	0	0	0	100	0
CarRentalOld_10	0	0	0	0	0	0	0	0	0	100
CarRentalOld_11	10	10	10	10	10	10	10	10	10	10
CarRentalOld_12	20	20	20	20	20	20	20	20	20	20
CarRentalOld_13	30	30	30	30	30	30	30	30	30	30

nduplicates: number of duplicate entries in the database

Oday Amer;166133997;18 January 1983;0569892211;Y46A49;Ford;2010;01 January 2012;14 February 2012;3256  
ODAY Amer;166133997;18 January 1983;0569892211;Y46A49;Ford;2010;01 January 2012;14 February 2012;3256  
Tariq Zeyad;142348490;22 January 2002;0514007615;I92V10;Mercedes;2010;06 September 2018;23 November 2018;9516  
Tariq Zeyad;142348490;22 January 2002;0514007615;I92V10;Mercedes;2010;06 September 2018;23 November 2018;9516  
Jamal Jaber;570696000;1 October 1992;0599150431;H73Q44;Mazda;2010;03 February 2014;18 April 2014;8769  
Jamal jaber;570696000;1 October 1992;0599150431;H73Q44;Mazda;2010;03 February 2014;18 April 2014;8769  
Salma Awwad;959748025;22 September 1977;0529671145;P69R89;BMW;2012;07 March 2017;08 May 2017;8432  
Salma AWWAD;959748025;22 September 1977;0529671145;P69R89;BMW;2012;07 March 2017;08 May 2017;8432  
Salma Zeyad;549015944;24 May 1976;0552097271;X84K99;Audi;2011;12 April 2019;21 April 2019;1116  
SALMA ZEYAD;549015944;24 May 1976;0552097271;X84K99;Audi;2011;12 April 2019;21 April 2019;1116  
Mohammad Oday;594156619;24 December 1980;0520007330;K98B84;Mitsubishi;2013;21 October 2019;12 November 2019;2112  
mohammad oday;594156619;24 December 1980;0520007330;K98B84;Mitsubishi;2013;21 October 2019;12 November 2019;2112

ndatechange: number of entries with wrong date format in the database

Abdul\_Kreem Jaber;616124608;16-09-1980;0522829088;J22P75;Honda;2014;30 May 2014;16 August 2014;8775  
Oday Mohammad;113842944;8 December 1996;0536019693;I34U51;Kia;2011;08 February 2020;12/03/2020;2310  
Zeyad Abdul\_Kreem;881333995;23/01/1990;0585245823;W43E68;Hyundai;2014;24 December 2015;03 March 2016;5040  
Nassar Nassar;654611291;23-09-1974;0528431949;O18L86;Ford;2014;17/11/2015;03 January 2016;2914

ndropnames: number of entries where names are dropped from the database

;873394725;24 May 1986;0586943234;R11C83;Honda;2010;08 December 2019;08 January 2020;3534  
;390830501;14 December 2002;0598288561;V42J70;Mercedes;2010;09 September 2012;21 November 2012;10804

ndropids: number of entries where person Ids are dropped from the database

Sana Mohammad;;19 December 1970;0532040890;G41I34;Kia;2011;17 June 2020;13 July 2020;2028  
Salma Alzeer;;22 February 1990;0579921549;J34M93;Honda;2011;16 November 2013;02 February 2014;7722

ndropdob: number of entries where DoB are dropped from the database

Abdul\_Kreem Abdullah;553295468;;0559635158;O44R90;Honda;2014;14 April 2019;24 May 2019;4440  
Razan Khalid;596892600;;0515781437;Z29N61;Mercedes;2013;09 March 2017;23 May 2017;12000

ndropmobiles: number of entries where mobile numbers are dropped from the database

Salem Mohammad;264568261;20 June 1988;;H49D36;BMW;2012;16 October 2018;04 January 2019;10400  
Mohammad Khalaf;643810795;12 April 1991;;G41F52;Mercedes;2015;17 May 2019;26 May 2019;1350

ndroppentry: number of entries where personal information cannot be completed (too many fields are dropped such as name, Id and mobile)

;;9 March 1971;;U66V38;Audi;2016;01 June 2020;08 July 2020;5106  
;;23 August 1987;;I81Z26;Volkswagen;2015;09 December 2017;01 February 2018;7128  
;;12 October 1979;;R91A11;Mazda;2014;23 November 2018;05 December 2018;1332

ndropcmake: number of entries where car make is dropped from the database

Tariq Awwad;391855758;21 May 1989;0564001450;U72V28;;2011;12 January 2013;28 January 2013;1264  
Saba Abedlrahman;827246177;13 January 1976;0532391563;I77P62;;2014;17 June 2018;18 July 2018;3069

ndropcids: number of entries where car Ids are dropped from the database (cannot be completed)

Zeyad Khalid;675287631;8 November 1990;0575923396;;Kia;2010;13 June 2017;25 July 2017;3150  
Razan Jaber;210060851;24 May 1976;0541113550;;BMW;2015;21 June 2016;08 July 2016;2074

ndropcyars: number of entries where car models (year) are dropped from the database

Zeyad Khalid;675287631;8 November 1990;0575923396;U72V28;Kia;;13 June 2017;25 July 2017;3150  
Razan Jaber;210060851;24 May 1976;0541113550; X72V30;BMW;;21 June 2016;08 July 2016;2074

