MINISTRY OF EDUCATION
IMAM ABDULRAHMAN BIN
FAISAL UNIVERSITY
COLLEGE OF COMPUTER SCIENCE
& INFORMATION TECHNOLOGY

وزارة التعليم
جامعة الإمام
عبدالرحمن بن فيصل
كلية علوم الحاسب
وتقنية المعلومات

جامعة الإمام عبدالرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY

Language Theory & Finite Automata

Assignment 1 - Track 2

Full Project

Student Name	Student ID
Hamad AlAjaji	2170005762
Majd Ashour	2170007697
Abdulaziz Bahassan	2170007260

Course Instructor

Dr. Atta-ur-Rahman

11/04/2020

Table of Contents

Table of Tables

Table of Figures

Part 1

1.1 Project Description

Our system is about airline companies, they use the user information to book a flight by sending the passport information and other user related information to the airplane company to make the reservation.

We develop our system to make the process automated by extracting the important information from the user database. And all of this done without human intervention.

Table 1: Mapping

#	Field	Delimiter	Description	Example
1	fName	$	Passenger's first name	$fName$
2	mName	$$	Passenger's middle name	$$mName$$
3	lName	$$$	Passenger's last name	$$$lName$$$
4	passportNum	#	Passenger's passport number	#passportNum#
5	passportExp	##	Passenger's passport expiration date	##passportExp##
6	Nationality	&	Passport's country of issue	&Nationality&
7	Gender	&&	Passenger's gender	&&Gender&&
8	DoB	&&&	Passenger's date of birth	&&&DoB&&&
9	flightNum	%	Flight number	%flightNum%
10	date	%%	Flight date	%%date%%
11	time	%%%	Flight time	%%%time%%%
12	Gate	*	Flight gate	*Gate*
13	Seat	**	Passenger's seat	**Seat**
14	departure	<-	Departing country	<-departure <-
15	destination	->	Arriving country	->destination->
16*	Separator	|	Separator between attributes	AttributeX|AttributeY

Table 2: Data Table

Field	Input
fName	Ali
Mname	waleed
lName	Alahmady
passportNum	837263524
passportExp	2021-05-22
Nationality	Saudi Arabia
Gender	M
DoB	2020-02-21
flightNum	EK021
date	2020-04-20
time	10:30
Gate	013
Seat	035
departure	Saudi Arabia
destination	America

1.2 Database

The bellow entity relation diagram shows the relationships between the tables of the database and the attributes of each table. As can be seen, each table has three attributes and that's where the regular expression comes in. The program will be able to extract the data from the user table and use them as an input in the flight table to generate a ticket to the passenger.

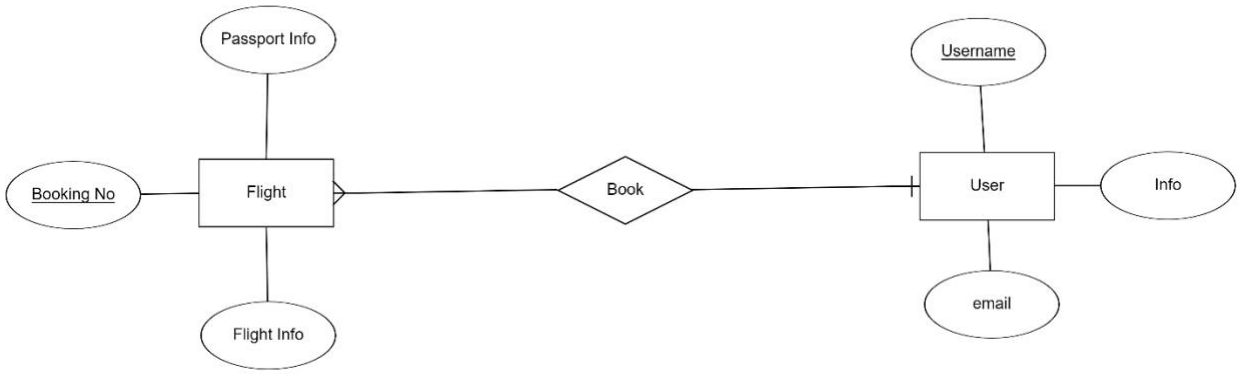


Figure 1: Entity Relation Diagram

username	passportInfo	email
mohammed	AliI$$Waleed$$I$$$alahmady$$$I&Saudi Arabia&I&&Male&&I&&&10/02/1977&&&I%12315468798798%I%%12/10/2023%%	mohammed@gmail.com
khalid	$Khalid$I$$Fahad$$I$$$Ali$$$I&United Kingdom&I&&Male&&I&&&09/12/1975&&&I%4333434%I%%20/10/2020%%	khalid@gmail.com

*Figure 2: User (Select *)*

bookingNum	passInfo	flightInfo	username
4	AliI$$Waleed$$I$$$alahmady$$$I&Saudi Arabia&I&&Male&&I&&&10/02/1977&&&I%12315468798798%I%%12/10/2023%%	<-Saudi Arabia<-I->America->I%443276%I%%09/04/2020%%I%%%10:30 PM%%%I*13*I**35**	mohammed
5	$Khalid$I$$Fahad$$I$$$Ali$$$I&United Kingdom&I&&Male&&I&&&09/12/1975&&&I%543445334%I%%20/10/2020%%I	<-United Kingdom<-I->Saudi Arabia->I%44327I%%%18/07/2021%%I%%%12:00 AM%%%I*15*I**20**	khalid

*Figure 3: Flight (Select *)*

1.3 Example:

fName|mName|lName|Nationality|gender|DoB|

Ali|$$Waleed$$|$$$alahmady$$$|&Saudi Arabia&|&&M&&|&&&1992-02-12&&&

passportNum | passportExp| departure| destination| flightNum| date| time| Gate| seat

#543445334#|##2032-01-22##| <-United Kingdom<-|->Saudi Arabia->

*|%EK001%|%%2032-07-21%%|%%%12:00%%%|*015*|**020***

Part 2

2.1 Deterministic Finite Automata

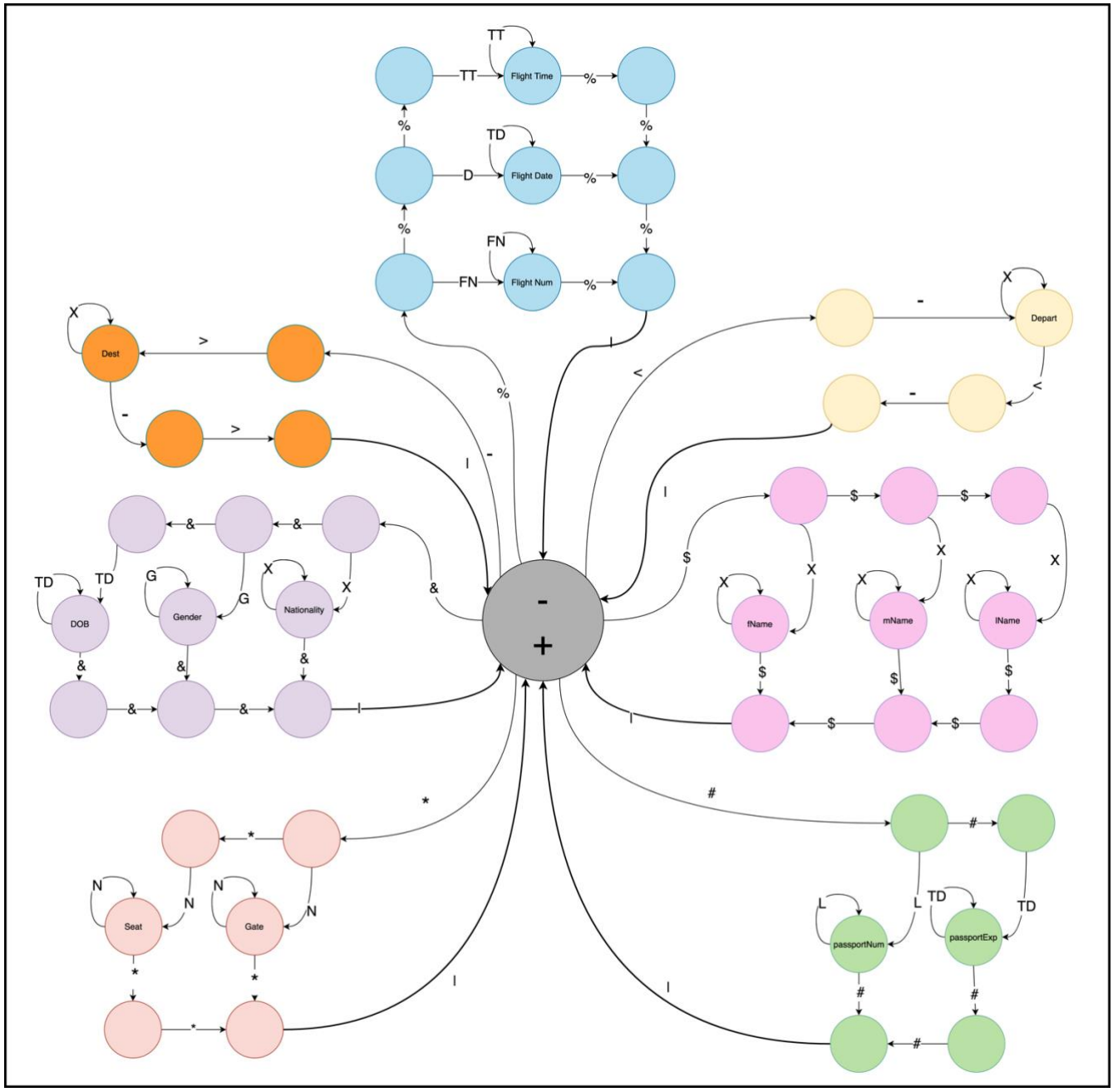


Figure 4: DFA

2.2 Production Rules

fName, mName, lName, Dest, Depart, Nationality:

Prod1 X → LETTER|X|^

Prod2 LETTER → a|b|..|z|A|B|…|Z|

Seat, Gate:

Prod1 N → DDD

Prod2 D → 0|1|…|9

passportNum:

Prod1 L → DDDDDDDDD

Prod2 D → 0|1|…|9

flightNum:

Prod1 FN → XXDDD

Prod2 X → A|B|…|Z

Prod3 D → 0|1|…|9

Gender:

Prod1 G→ M|F

Time:

Prod1 TT → DDSDD

Prod2 D → 0|1|…|9

Prod3 S → :

Date, DOB, passportExp:

Prod1 TD → DDDDBDDBDD

Prod2 D → 0|1|…|9

Prod3 B → -

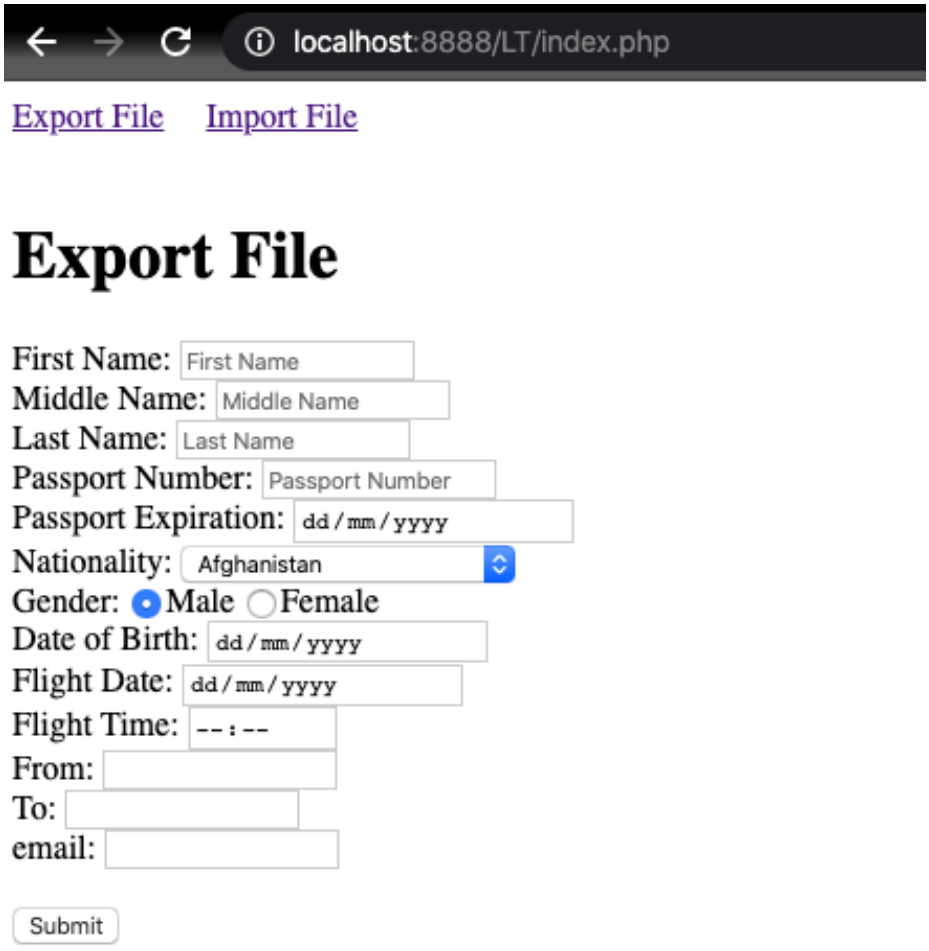
Example:

Ali|$$Waleed$$|$$$alahmady$$$|&Saudi Arabia&|&&M&&|&&&1998-02-21&&&
|#543445334#|##2031-03-11##| <-United Kingdom<-|->Saudi Arabia->
*|%EK001%|%%2032-07-21%%|%%%12:00%%%|*015*|**020***

Part 3:

Export File:

User first visits the Export File page where they are asked to input the information regarding their flight and once they click submit a ticket will be generated and be saved in the database. Afterwards, the syntax analyzer will generate the correct language with respected delimiter for each field. Finally, the file will be downloaded where it contains the language as seen in Figure 5.



.

Figure 5:Export Page

Import File

After the user obtains a text file with a language. The lexical analyzer will check whether the language is valid or not. If the language is valid, it will display the data accordingly as seen in figure 6. Otherwise, NaN will be displayed.

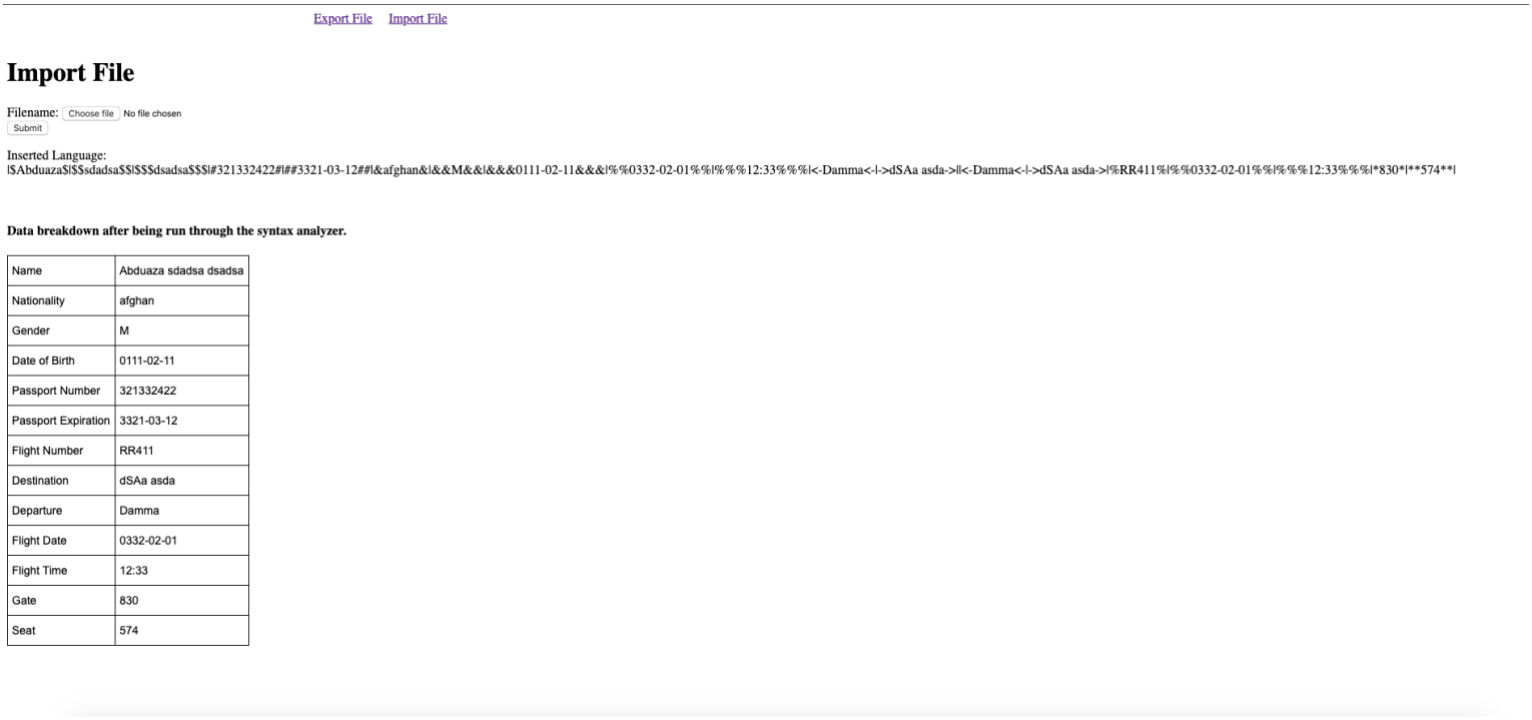


Figure 6: Import Page