

Introduction to

Databases with SQL

Designing

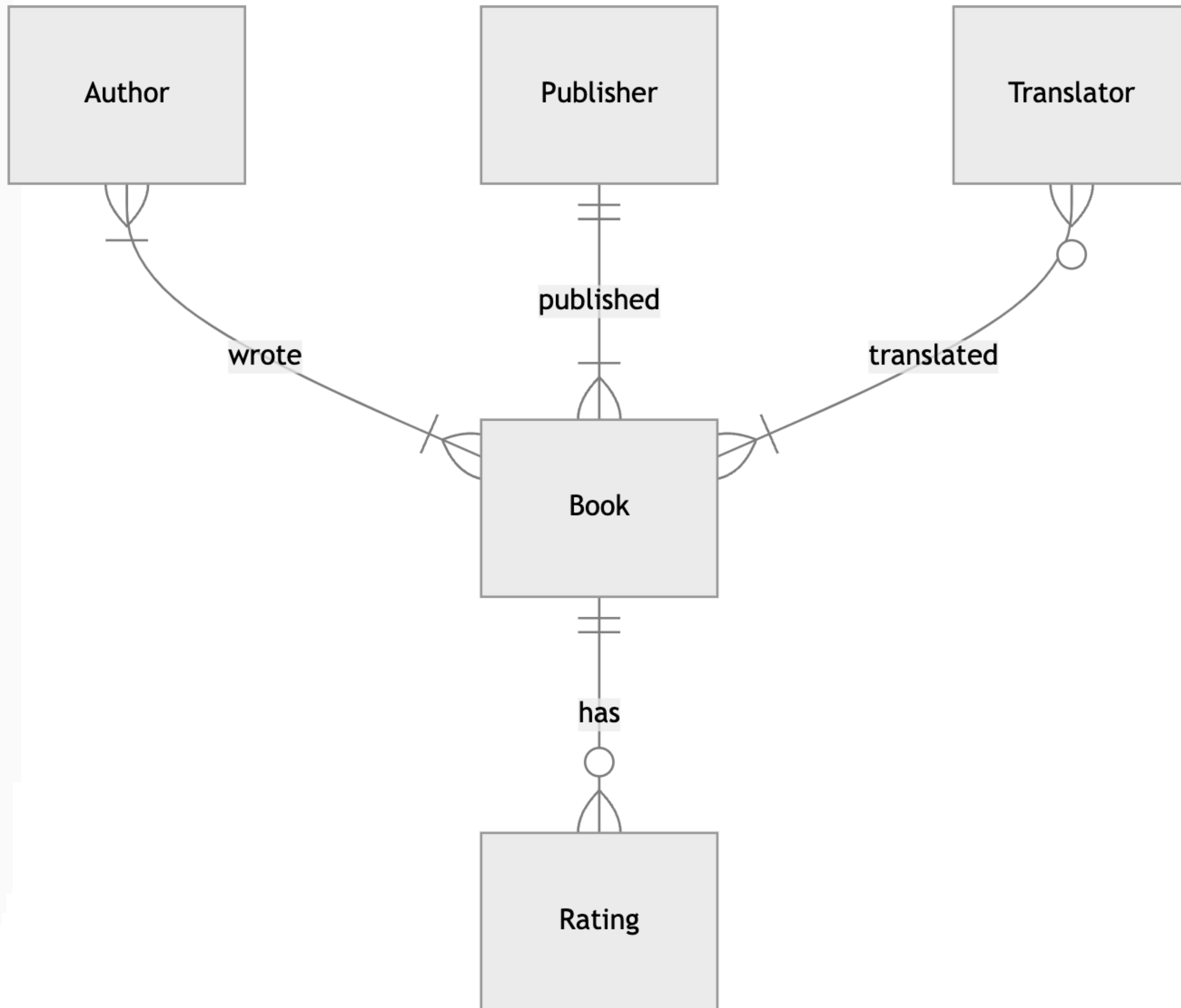


The Booker Prizes

```
sqlite3 FILENAME
```

SELECT

.schema



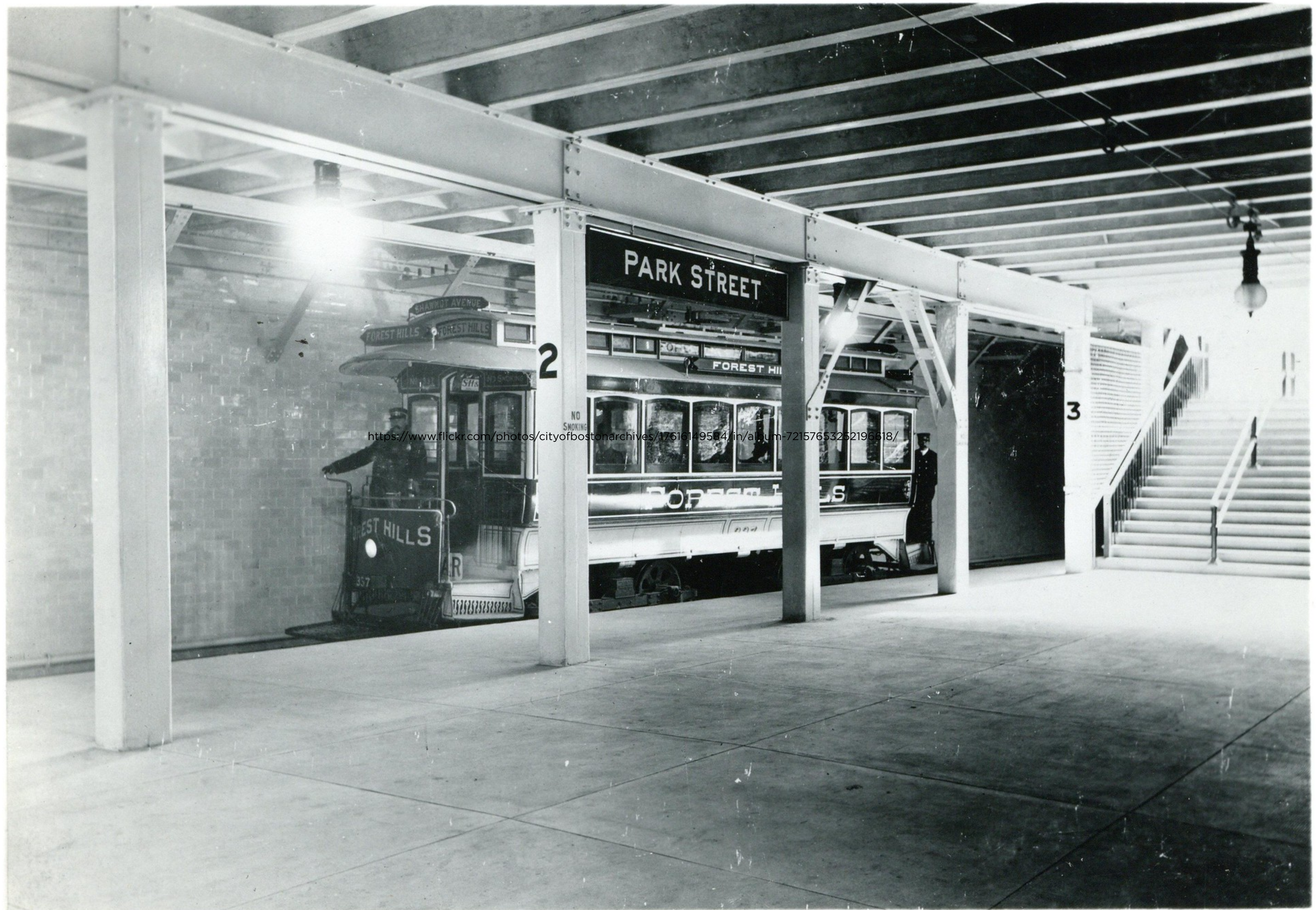
.schema TABLE



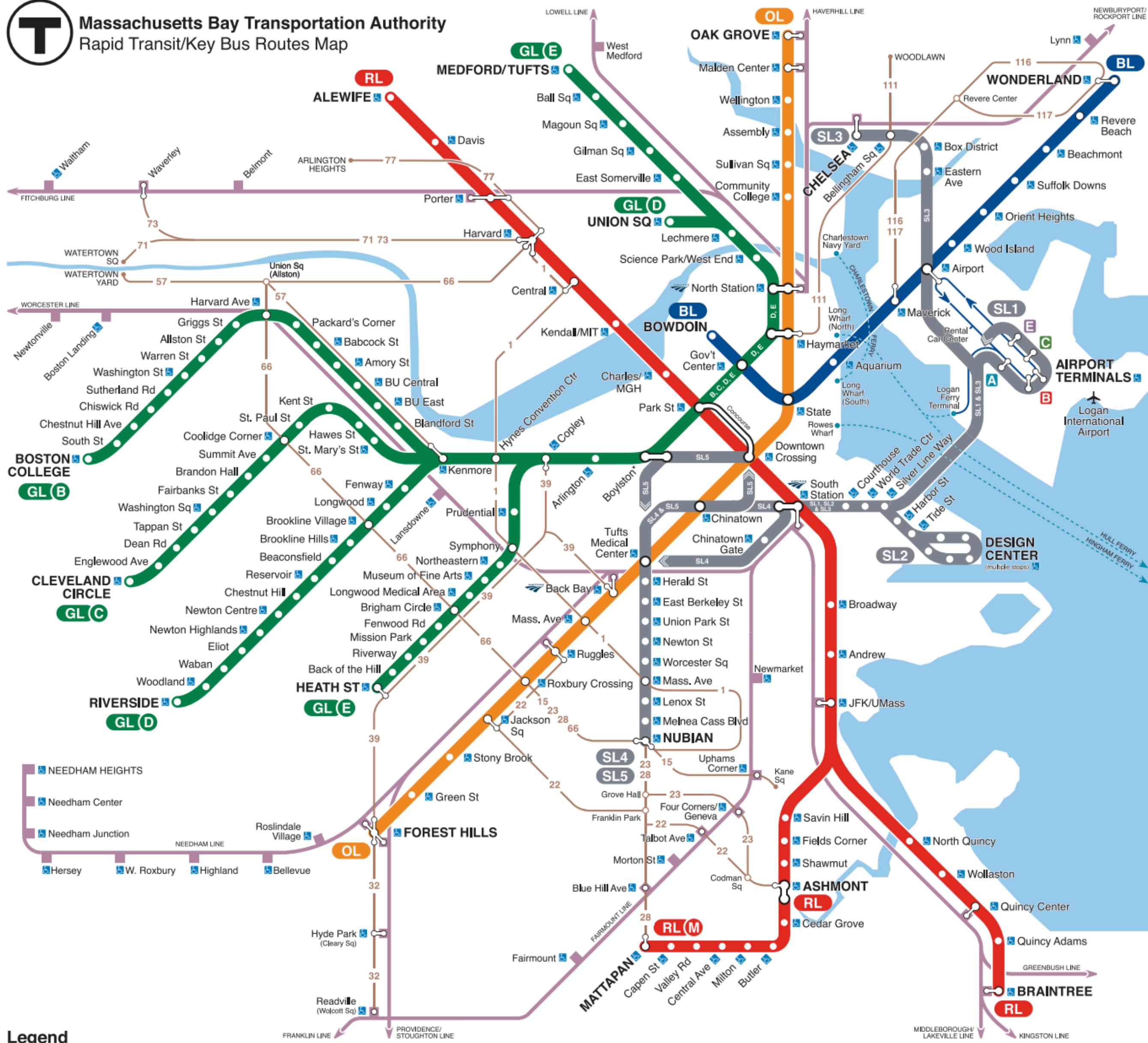
*653. WORK ON SEC. 5, LOOKING NORTHERLY.

Nov. 2 '96.





Massachusetts Bay Transportation Authority Rapid Transit/Key Bus Routes Map



Legend

- | | | | | | | | |
|------------------------|------------------------------------|--------------------------------------|---|--|---|-----------------|--|
| RL RED LINE | SL SILVER LINE and branches | SL1 SL2 SL3 SL4 SL5 | COMMUTER RAIL | Accessible station
All MBTA and Massport bus and ferry services are accessible | Free Logan Airport shuttle bus | @MBTA | Customer Communications & Travel Info
617-222-3200, 800-392-6100, TTY 617-222-5146, www.mbta.com |
| M MATTAPAN LINE | GL GREEN LINE and branches | | KEY BUS ROUTE
Frequent service | Rapid Transit transfer station | Amtrak service
Back Bay, North & South Stations | /TheMBTA | MBTA Transit Police: 911
TTY 617-222-1200 |
| OL ORANGE LINE | B Terminates at Gov't Ctr | D Terminates at Union Sq | FERRY | Commuter Rail transfer station | | @TheMBTA | Elevator/Escalator availability: 617-222-2828 |
| BL BLUE LINE | C Terminates at Gov't Ctr | E Terminates at Medford/Tufts | *Boylston: Accessible for Silver Line only | | | /MBTAGM | |
| | | | | | | @TheMBTA | |

Schema

name	station
Charlie	Kendall/MIT

name	station	action
Charlie	Kendall/MIT	enter

name	station	action	fare
Charlie	Kendall/MIT	enter	10

name	station	action	fare	balance
Charlie	Kendall/MIT	enter	10	5

name	station	action	fare	balance
Charlie	Kendall/MIT	enter	10	5
Charlie	Jamaica Plain	exit	5	0

name	station	action	fare	balance
Charlie	Kendall/MIT	enter	10	5
Charlie	Jamaica Plain	exit	5	0
Alice	Harvard	enter	10	20

name	station	action	fare	balance
Charlie	Kendall/MIT	enter	10	5
Charlie	Jamaica Plain	exit	5	0
Alice	Harvard	enter	10	20
Alice	Park Street	exit	5	15

name	station	action	fare	balance
Charlie	Kendall/MIT	enter	10	5
Charlie	Jamaica Plain	exit	5	0
Alice	Harvard	enter	10	20
Alice	Park Street	exit	5	15
Bob	Alewife	enter	10	30

name	station	action	fare	balance
Charlie	Kendall/MIT	enter	10	5
Charlie	Jamaica Plain	exit	5	0
Alice	Harvard	enter	10	20
Alice	Park Street	exit	5	15
Bob	Alewife	enter	10	30
Bob	Park Street	exit	10	20

id	name	station	action	fare	balance
1	Charlie	Kendall/MIT	enter	10	5
2	Charlie	Jamaica Plain	exit	5	0
3	Alice	Harvard	enter	10	20
4	Alice	Park Street	exit	5	15
5	Bob	Alewife	enter	10	30
6	Bob	Park Street	exit	10	20

id	name	station	action	fare	balance
1	Charlie	Kendall/MIT	enter	10	5
2	Charlie	Jamaica Plain	exit	5	0
3	Alice	Harvard	enter	10	20
4	Alice	Park Street	exit	5	15
5	Bob	Alewife	enter	10	30
6	Bob	Park Street	exit	10	20

id	name	station	action	fare	balance
1	Charlie	Kendall/MIT	enter	10	5
2	Charlie	Jamaica Plain	exit	5	0
3	Alice	Harvard	enter	10	20
4	Alice	Park Street	exit	5	15
5	Bob	Alewife	enter	10	30
6	Bob	Park Street	exit	10	20

id	name	station	action	fare	balance
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2	Charlie	Jamaica Plain	exit	5	0
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5	Bob	Alewife	enter	10	30
6	Bob	Park Street	exit	10	20

id	name	station	action	fare	balance
1	Charlie	Kendall/MIT	enter	10	5
2	Charlie	Jamaica Plain	exit	5	0
3	Alice	Harvard	enter	10	20
4	Alice	Park Street	exit	5	15
5	Bob	Alewife	enter	10	30
6	Bob	Park Street	exit	10	20

riders

id	name
1	Charlie
2	Alice
3	Bob

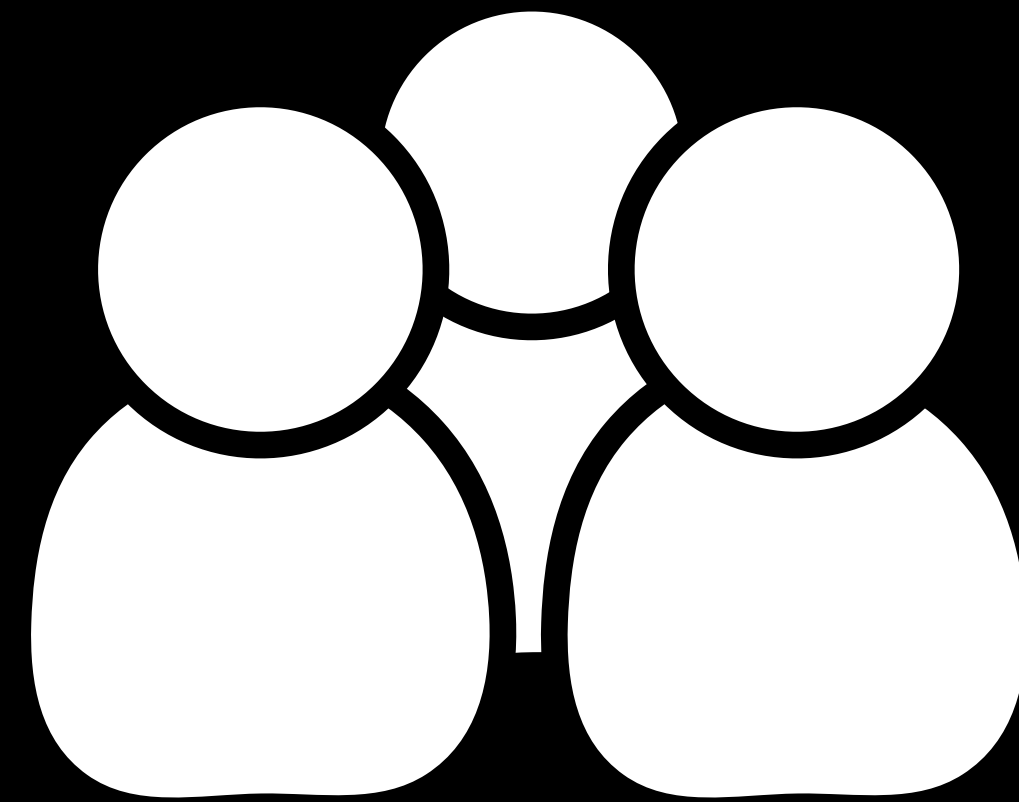
stations

id	location
1	Harvard
2	Kendall/MIT
3	Park Street

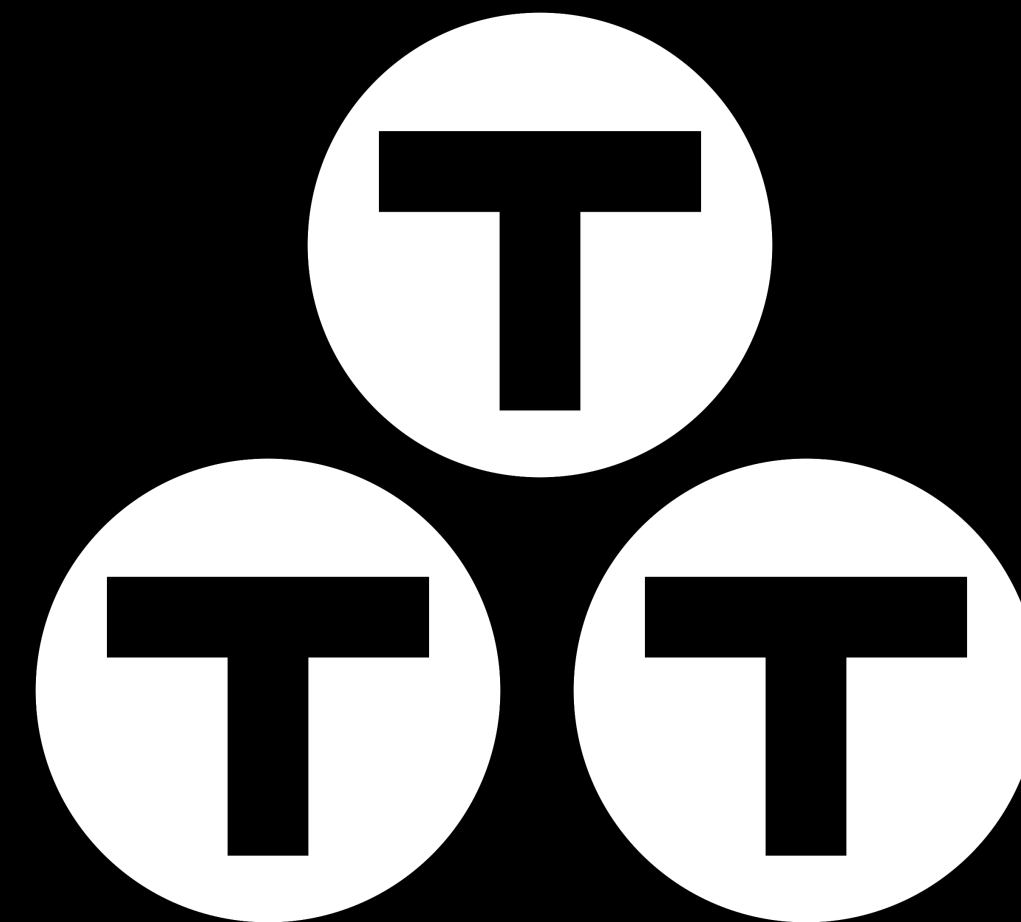
Normalizing

Relating

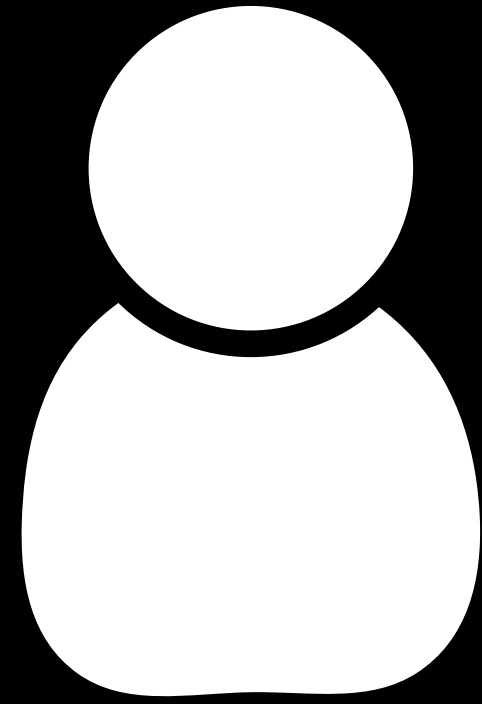
riders



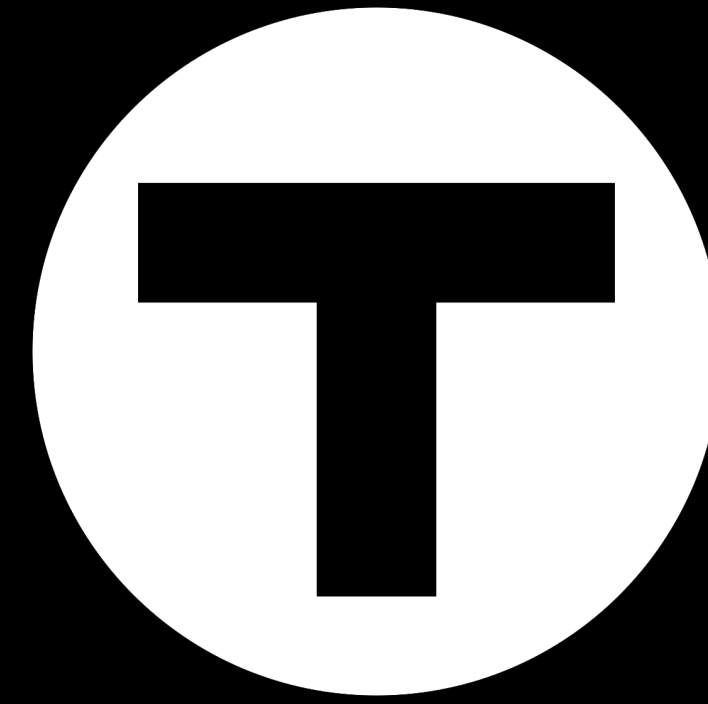
stations



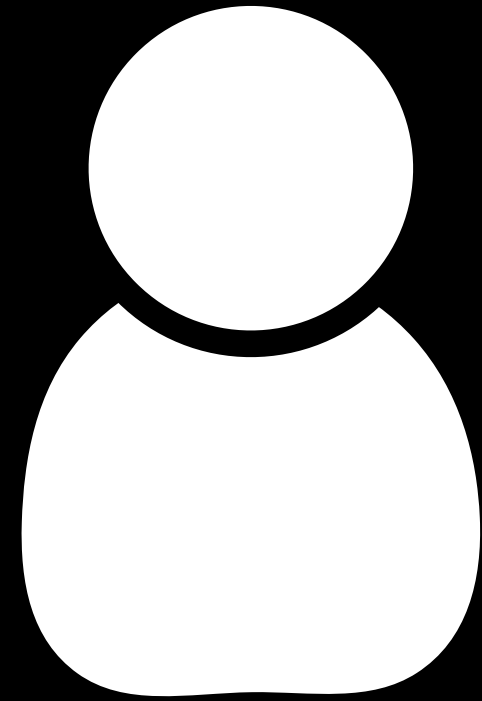
rider



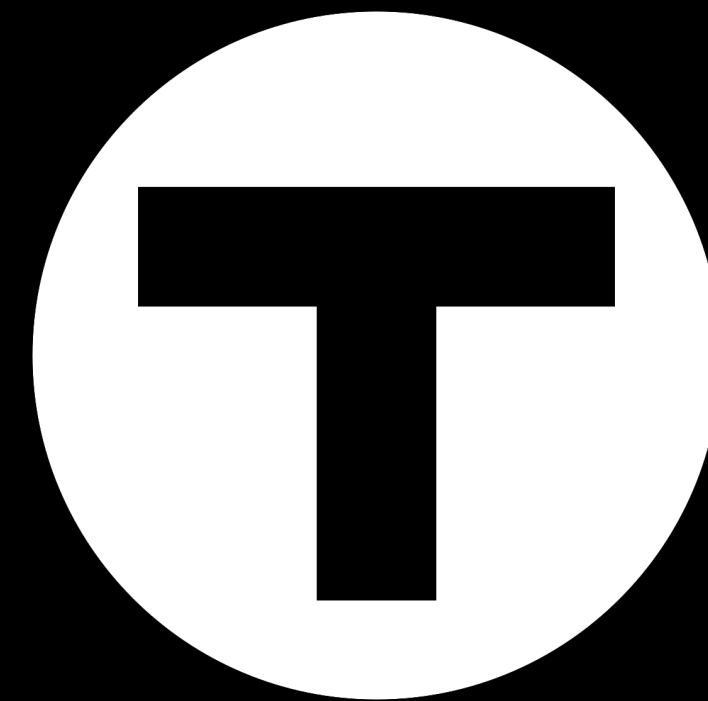
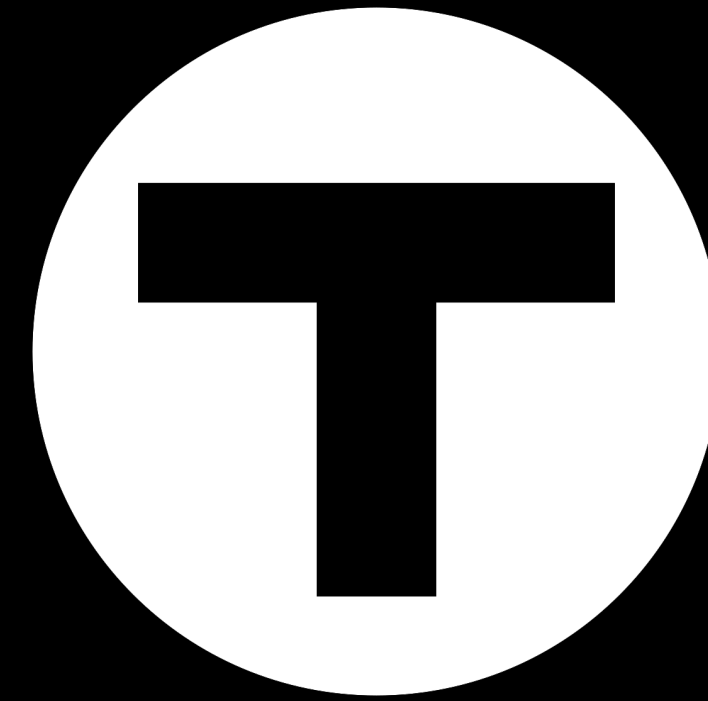
station



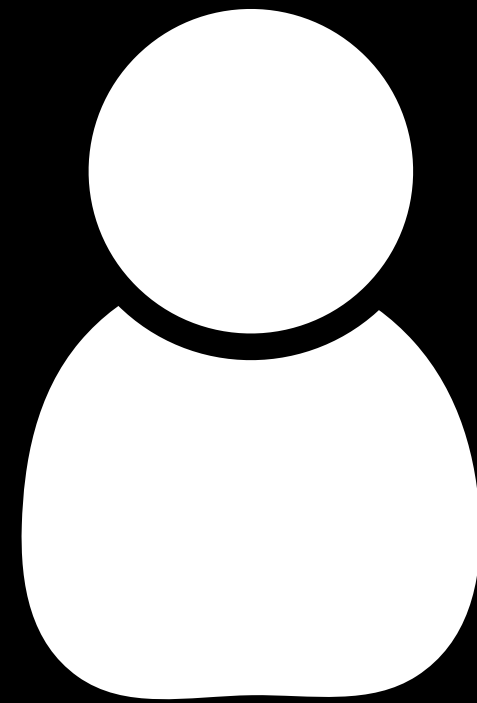
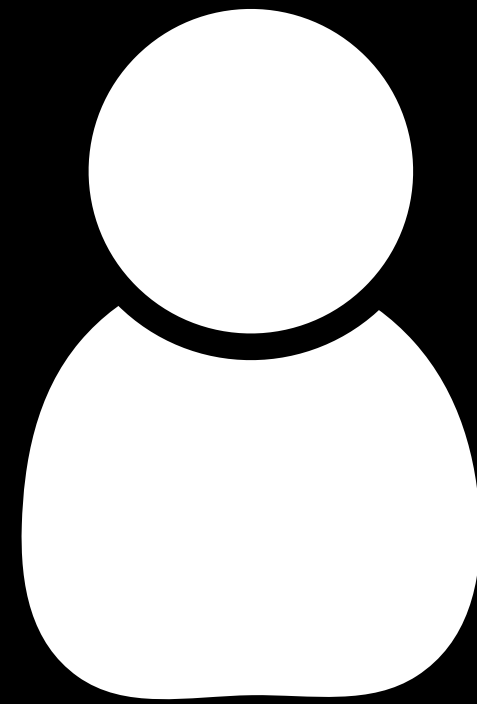
rider



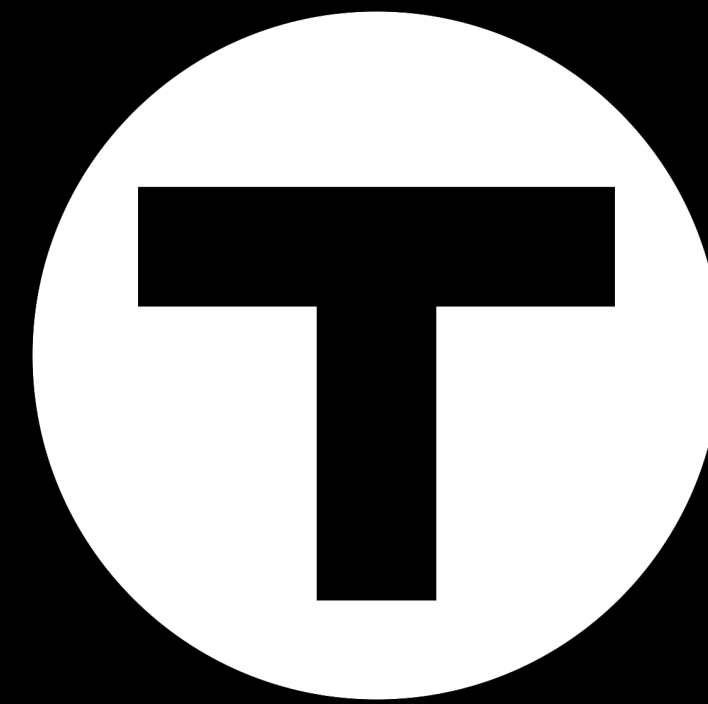
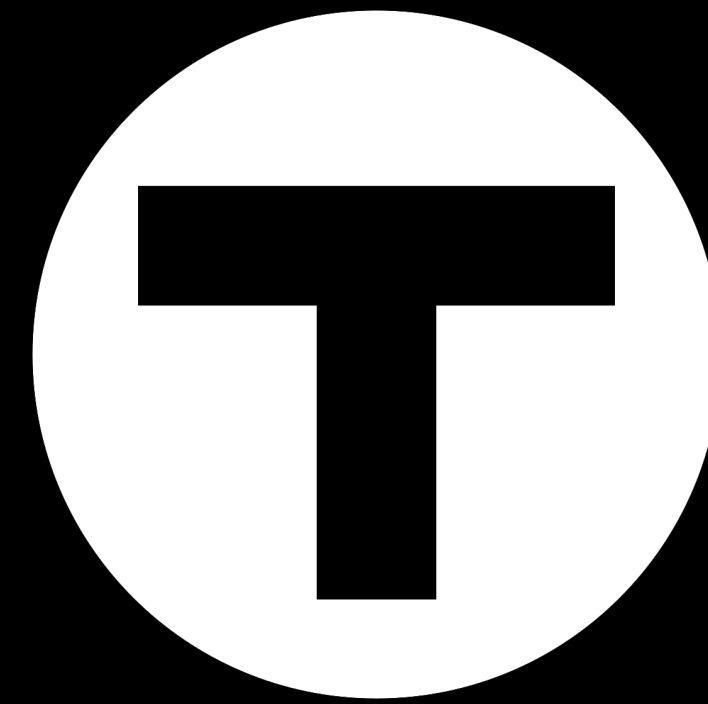
stations



riders



stations





Rider



visits



Station

CREATE TABLE

Data Types

Storage Classes

NULL

INTEGER

REAL

TEXT

BLOB

INTEGER

0-byte integer

1-byte integer

2-byte integer

3-byte integer

4-byte integer

6-byte integer

8-byte integer

"Red Line"



All Commuter Rail stations have parking except:
Belmont, Boston Landing, Blue Hill Ave, Chelsea,
Four Corners/Geneva, JFK/UMass, Lansdowne,
Mishawum, Morton St, Newmarket, Newtonville,
Pawtucket/Central Falls, Prides Crossing, Porter,
Quincy Center, River Works, Tabbot Ave,
Uphams Corner, Waverley, Windsor Gardens.

LEGEND

- Commuter Rail lines
- Terminus station
- Commuter Rail lines (under construction)
- Accessible station
All MBTA ferry services are accessible
- Transfer station
- FERRY
- Amtrak service
- RED LINE
- MATTAPAN LINE
- ORANGE LINE
- BLUE LINE
- SILVER LINE and branches
- GREEN LINE and branches
- Free Logan Airport shuttle bus
- PayByPhone
- EV charging stations
- Customer Communications & Travel Info
617-222-3200, 1-800-392-6100,
TTY 617-222-5146, mta.com
- MBTA Transit Police: 617-222-1212 or 911
TTY 617-222-1200
- Elevator/Escalator availability: 617-222-2828

*Bayston: Accessible for Silver Line only
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mbta.jpg

10

\$0.10

0.10

Type Affinities

TEXT

NUMERIC

INTEGER

REAL

BLOB

10

id	amount
----	--------

id	amount
1	"10"

25

id	amount
1	"10"

id	amount
1	"10"
2	"25"

"10"

id	amount
----	--------

id	amount
1	10

"25"

id	amount
1	10

id	amount
1	10
2	25

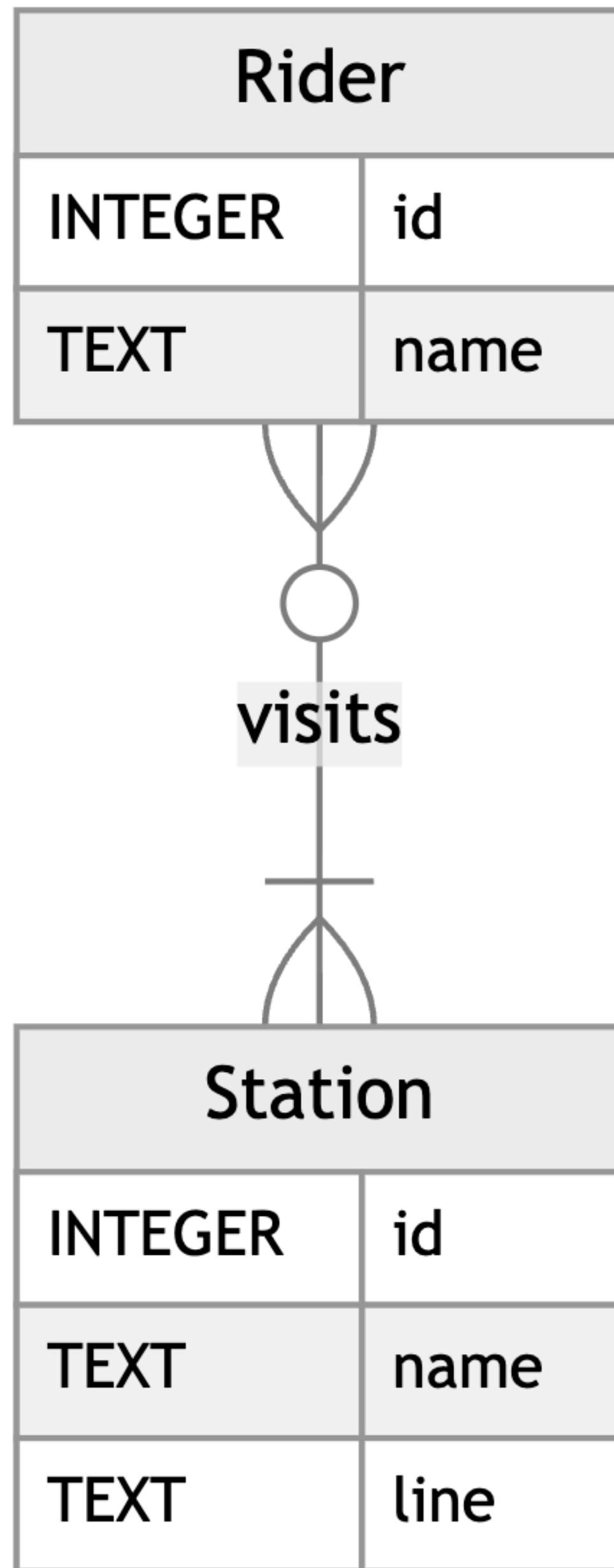


Table Constraints

PRIMARY KEY

FOREIGN KEY

Column Constraints

CHECK

DEFAULT

NOT NULL

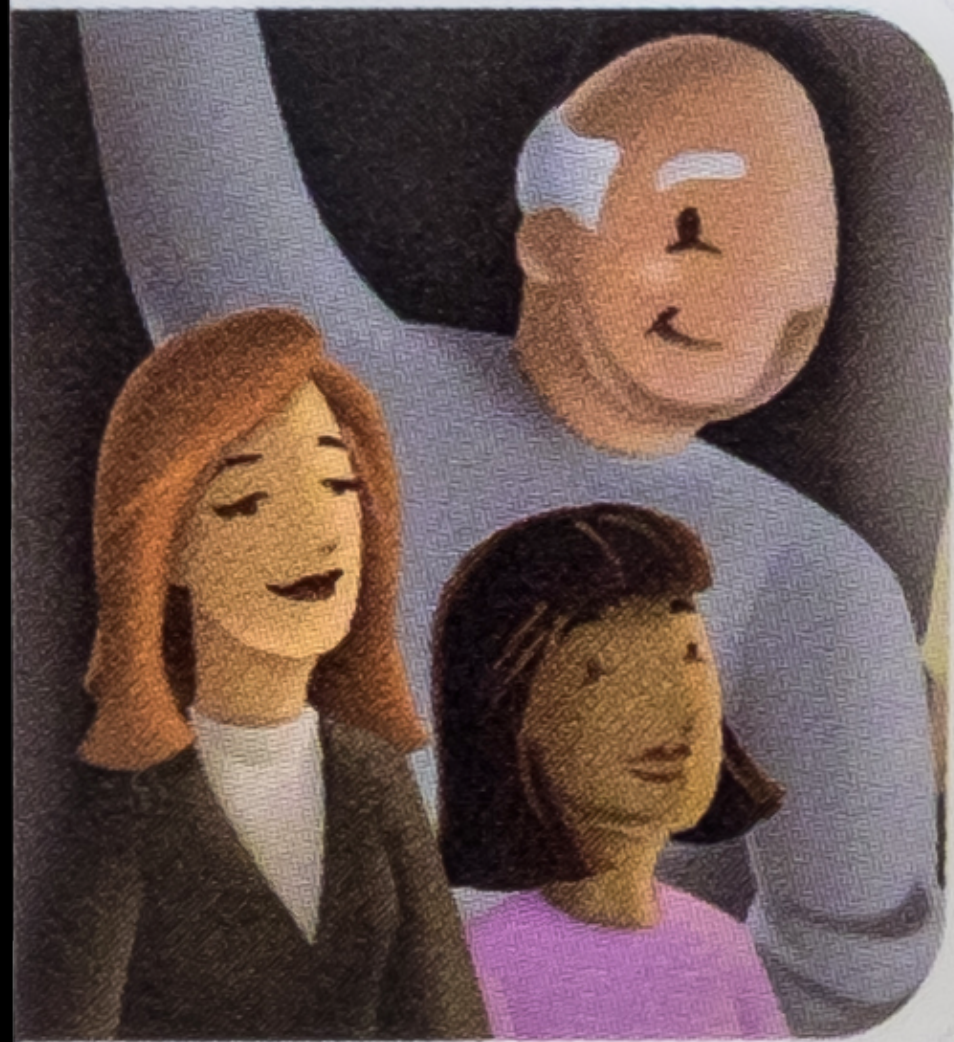
UNIQUE

Rider	
INTEGER	id
TEXT	name



Station	
INTEGER	id
TEXT	name
TEXT	line

CharlieCard

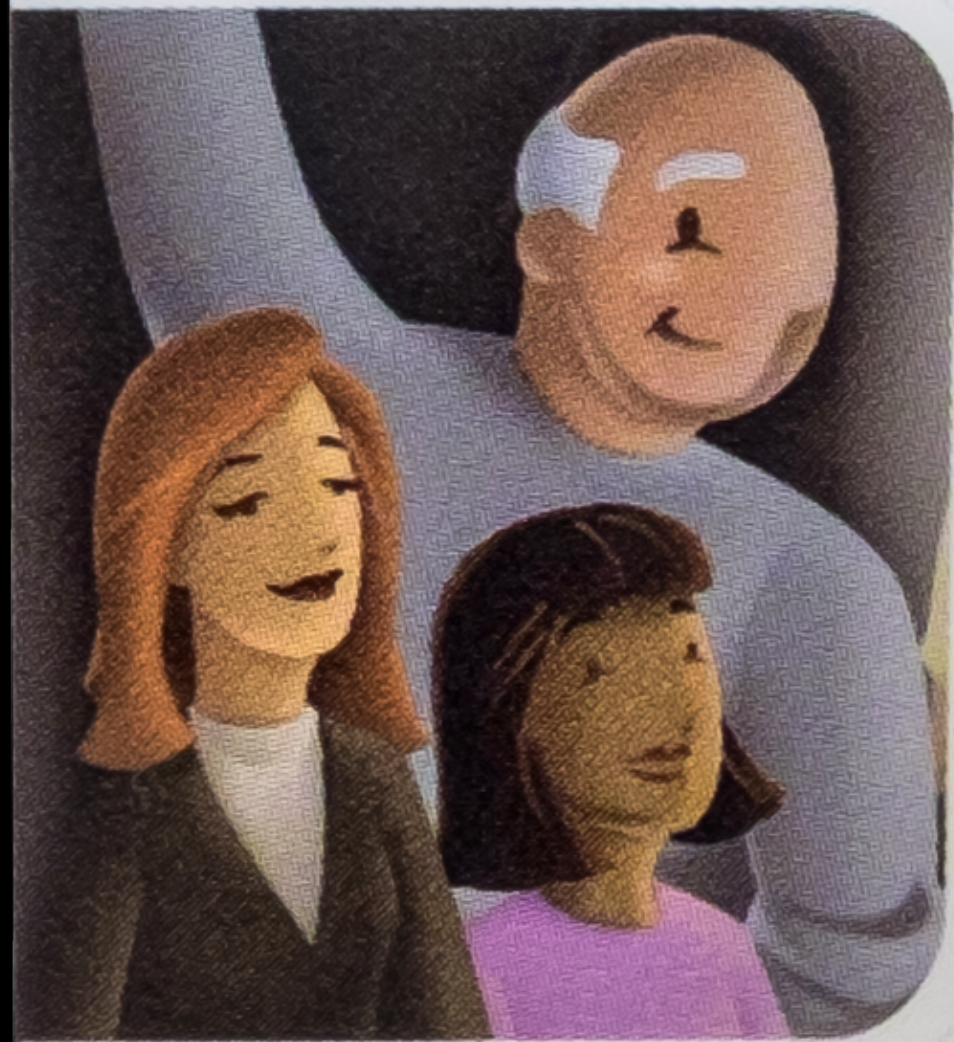


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Break

CharlieCard

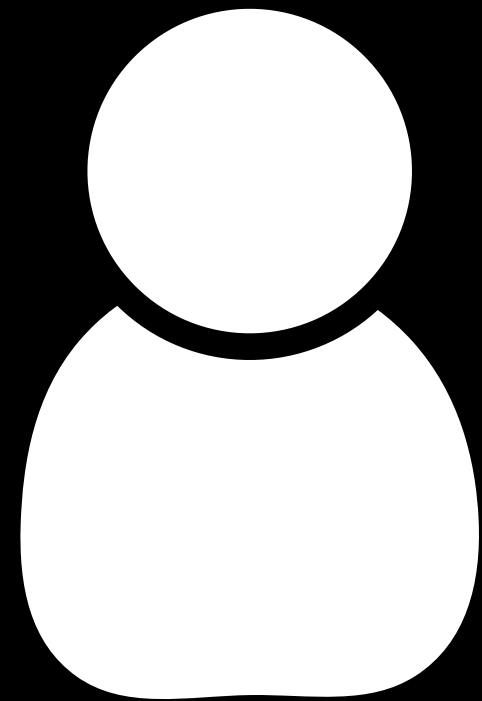


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Schema

rider



card

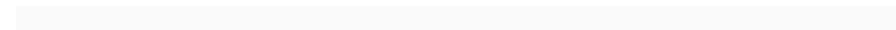




makes



at



Card	
INTEGER	id



makes



Swipe	
INTEGER	id
TEXT	type
NUMERIC	datetime
NUMERIC	amount



at



Station	
INTEGER	id
TEXT	name
TEXT	line

Altering Tables

DROP TABLE

ALTER TABLE ...

RENAME TO ...

ADD COLUMN ...

RENAME COLUMN ... TO ...

DROP COLUMN ...

Column Constraints

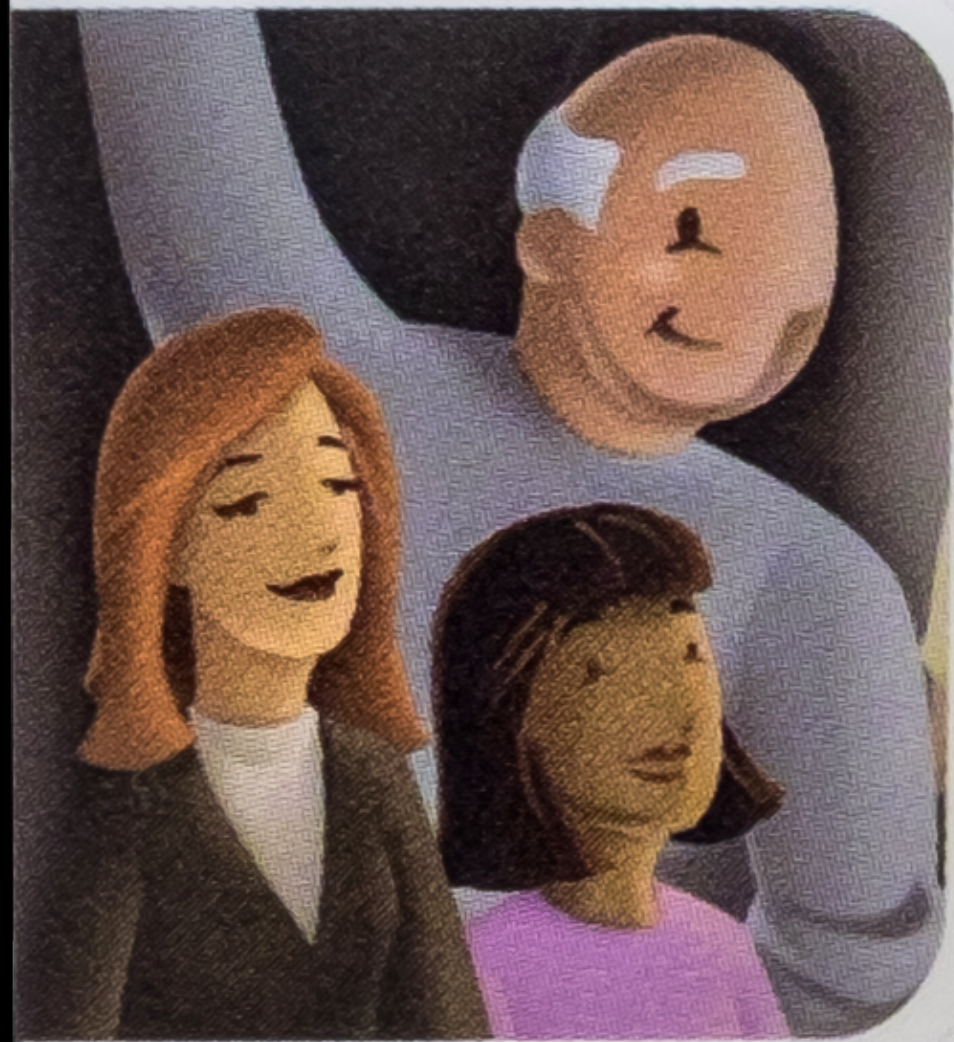
CHECK

DEFAULT

NOT NULL

UNIQUE

CharlieCard



Massachusetts Bay Transportation Authority

Exp: 02/62

The KINGSTON TRIO

NEWPORT
FOLK FESTIVAL
CLASSICS



Live at
NEWPORT

"Charlie handed in his dime at the Kendall Square Station and he changed for Jamaica Plain.

When he got there the Conductor told him, 'One more nickel,' Charlie couldn't get off of that train!"

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Designing