FINAL REPORT

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The data we found gives detailed information about the Railroad crossing accident in the USA. These accidents have many different attributes such as the date of their occurrence, the weather conditions in which the accident occurred, the number of dead and injured. This dataset can be used for a large number of research such as accident prediction, examining the locations of accidents, extracting cause-effect relationships to predict accidents.Also, the dataset cover accidents from 1st January 1975 to 28 February 2021.

2) We made changes in our database according to Phase 1 and added new tables. We created 2 new tables named Incident2Value and IncidentTypeName by removing some data from the Incident table. We added the data we extracted from the Incidents table to these tables. We transferred the data such as temperature, car number, train speed, user age, injured, killed,number of loco from incidents to the IncidentTypeName table. We linked the Inciden2Value table with the incidents table. We also linked the Incident2Value table with the incidenttypename table. Thus, our table has become compatible with 3NF rules.

3) We first downloaded our data as a .csv file from https://www.kaggle.com/yogidsba/us-highway-railgrade-crossing-accident. Then, we transferred the data in the csv file in php language to phpmyadmin as a single table. The code first creates a single table by taking the attributes from the first row in the csv. Then it transfers the data in each row to this table. Afterwards, we wrote new code, pulled the data from the table, and transferred all the data to the tables in our er diagram with the help of if statements. In our data, there were 23 rows belonging to the same accident and report number. Because of Date, Accident Number, Report Number are primary keys, we did not transfer these 23 rows belonging to the same primary key.

4) Our data has 239464 rows. So, we couldn't use mySQL Workbench. We have a Centos 7 server, we used it with PhpMyAdmin and PHP.

5)

View incidentsWithRailRoad : It shows incidents details with Rail Road Company, Highway User, Highway Position, Visibility Situation.

View incidentsWithStates: It shows incident's number, report key, date, time and county, state informations. For example we can use this when we want see a state's incidents.

View incidentsWithTypes: It shows incident number, report key, incident details like temperature, injured numbers or death numbers. For each detail like temperature, injured, killed it has one row.

PROCEDURE HighestTrainSpeedKilled: Selects the number of the incident with the highest train speed. Then it displays the total number of deaths in incidents at this speed.

PROCEDURE LowestTrainSpeedKilled: Selects the number of the incident with the lowest train speed. Then it displays the total number of deaths in incidents at this speed.

PROCEDURE getAccidentsFromState: Shows the last 20 accidents of the entered state.

PROCEDURE getMostState: It gives the latest accident information in the state with the most incidents.

6)

Our favorite procedure **getAccidentsFromState's output:**

`getAccidentsFromState` yordamı yürütme sonuçları

idincidentnum	reportkey	date	time	narrative
2021005	IAIS2021005202101	2021-12-01	12:13:00	BICB-11 WAS TRAVELING WESTBOUND THROUGH CORALVILLE, IA WHEN A VEHICLE SOUTHBOUND ON WESTCOR DRIVE TRIED TO STOP, WENT THROUGH CROSSING GATE AND ENDED UP STOPPED ON THE TRACKS WHERE IT WAS STRUCK BY THE TRAIN.
0221GP011	UP0221GP011202102	2021-11-02	07:20:00	HIGHWAY USER'S ACTIONS: DID NOT STOP.
KS0221201	BNSFKS0221201202102	2021-11-02	19:17:00	TRAIN STRUCK PEDESTRIAN THAT WENT AROUND THE GATES AND STOPPED ON THE CROSSING. NO HAZMAT RELEASED.
0221HO019	UP0221HO019202102	2021-10-02	18:40:00	HIGHWAY USER'S ACTIONS: STOPPED ON CROSSING (BEFORE GATES DESCENDED).
195716	CSX000195716202102	2021-10-02	17:31:00	A01010 WAS STRUCK BY OCCUPIED GOLD CHEVY TAHOE SUV THAT DROVE THROUGH GATE ARMS, THEN FLED THE SCENE. PROTECTION ALSO AT CROSSING: PAVEMENT MARKINGS (STOP LINES & RR XING SYMBOLS). AGE AND GENDER OF DRIVER UNKNOWN.
195653	CSX000195653202102	2021-10-02	14:07:00	N30208 REPORTS STRIKING A UNOCCUPIED FARM TRACTOR AND TRAILER AT CROSSING. PROTECTION ALSO AT CROSSING: PAVEMENT MARKINGS (STOP LINES & RR XING SYMBOLS).
0221HO024	UP0221HO024202102	2021-10-02	10:00:00	HIGHWAY USER'S ACTIONS: WENT THRU GATE - MOVING AND STRUCK 87TH CAR IN CONSIST.
21021	SCAX021021202102	2021-10-02	17:40:00	ML812-10 STRUCK A VEHICLE AT THE 17TH ST CROSSING DOT #026699P ON THE METROLINK ORANGE SUBDIVISION.THE CAR WAS STOPPED BETWEEN THE ENTRANCE GATES AND THE CROSSING WITH THE FRONT OF THE VEHICLE FOULING THE CROSSING. THE TRAIN STRUCK THE FRONT OF THE VEHICLE. THERE WERE NO INJURIES REPORTED FROM THISINCIDENT.
RD0221203	BNSFRD0221203202102	2021-10-02	18:07:00	USER'S AGE UNKNOWN. VEHICLE DROVE INTO THE SIDE OF A LOCOMOTIVE THAT WAS OCCUPYING THE GRADE CROSSING. NO HAZMAT RELEASED.
21011001	KCS21011001202101	2021-10-01	22:08:00	A TRUCK WAS BACKING UP THE TRAILER & HIT THE CROSSING ARM & BENT THEM & MOVED THE TRAILER ONTO TRACK. TRAIN STRUCK REAR OF TRAILER ON THE TRACK. UP TRACK DAMAGE $132. MP 26.34 CUERO SUB
195623	CSX000195623202102	2021-09-02	12:55:00	MOTORIST FAILED TO YIELD TO ACTIVATED CROSSING LIGHTS AND STRUCK THE SIDE OF G03608. PROTECTION ALSO AT CROSSING: ADVANCE WARNING AND PAVEMENT MARKINGS (STOP LINES & RR XING SYMBOLS).
210209003	LBWR210209003202102	2021-09-02	13:15:00	AT 1315 ON 2/9/2021, THE 101 CREW STRUCK A SEMI TRUCK, TAKING OFF THE BUMPER AND COSMETICS ON THE FRONT OF THE TRUCK THAT STALLED ON THE TRACKS AS IT WAS TRYING TO BACK UP TO CLEAR THE CROSSING NEAR BROWNFIELD, TX. NO INJURIES, NO HAZMAT. MINOR COSMETIC DAMAGE TO THE WAMX 4137, NO RAILCAR DAMAGE. THE DRIVER OF THE SEMI WAS ISSUED A CITATION FOR FAILURE TO YIELD TO RIGHT OF WAY.
CCO2O921	AMCCO2O921202102	2021-09-02	13:40:00	TRACK CLASS IS 1, IT WOULD NOT POPULATE IN THE FORM
RD0221202	BNSFRD0221202202102	2021-08-02	06:38:00	TRAIN STRUCK VEHICLE THAT WAS UNOCCUPIED ON THE CROSSING. NO HAZMAT RELEASED.
Konsol	NS140205202101	2021-08-01	21:20:00	NS TRAIN 384A307 WAS INVOLVED IN A CROSSING INCIDENT, NOT CLEAR IF THE TRAIN WAS STRUCK BY HWY-USERGOING AROUND DOWNED GATES OR IF THE HWY USER WAS STRUCK BY TRAIN. DRIVER NOT VERIFIED.

Our favorite view **incidentsWithRailRoad**'s output:

> >> Tümünü göster | Satır sayısı: 25 | Satırları süz: Bu tabloda ara

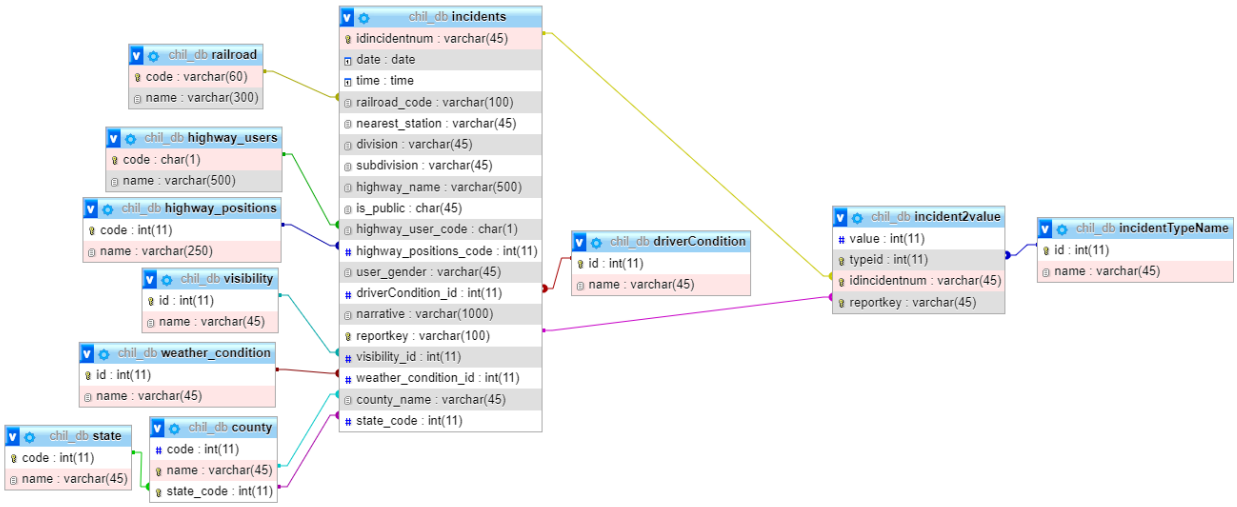
+ Seçenekler

	idincidentnum	reportkey	date	time	railroad_name	railroad_code	visibility	highway_user_name	highway_position	narrative	nearest_station	division	subdivision	is_public	user_gender
Düzenle Kopyala Sil	011394GC	NYSW011394GC199401	1994-01-13	06:50:00	New York, Susquehanna & Western Railroad Company	NYSW	Dawn	Auto	Stalled or stuck on crossing		BUTLER			Y	
Düzenle Kopyala Sil	0113FW013	UP0113FW013201301	2013-12-01	05:15:00	Union Pacific Railroad Company	UP	Dawn	Auto	Stalled or stuck on crossing	HIGHWAY USER'S ACTIONS: CROSSING WAS OUT OF SERVIC...	POLY		DALLAS SUB	Y	Female
Düzenle Kopyala Sil	0113UT011	UP0113UT011201301	2013-01-24	06:46:00	Union Pacific Railroad Company	UP	Dawn	Auto	Stalled or stuck on crossing	HIGHWAY USER'S ACTIONS: STOPPED ON CROSSING (NO GA...	EMORY		EVANSTORN SUB	N	Male
Düzenle Kopyala Sil	0119MA042	UP0119MA042201901	2019-01-30	05:05:00	Union Pacific Railroad Company	UP	Dawn	Truck-trailer	Stalled or stuck on crossing	HIGHWAY USER'S ACTIONS: STOPPED ON CROSSING (NO GA...	CON HBD		VAN BUREN SUB	Y	Male
Düzenle Kopyala Sil	0120CM005	UPME0120CM005202001	2020-10-01	06:18:00	Union Pacific Metra	UPME	Dawn	Auto	Stalled or stuck on crossing	HIGHWAY USER'S ACTIONS: STOPPED ON CROSSING (BEFOR...	LOMBARD		GENEVA SUB	Y	Male

Konsol

7) On the return of our Phase 1 report, we learned from our teacher that our table is not 3NF-compliant and that some data could be stored more efficiently. We have made the necessary corrections.

8)



9)

```php
<?php
set_time_limit(0);
require_once "database.php";
$file = fopen("data.csv","r");
$count = 0;

$getDataFirst = fgetcsv($file, 10000, ";");

while (($getData = fgetcsv($file, 10000, ";")) !== FALSE)
        {
    $array = array();
    $values = array();
    $i = 0;
    foreach($getDataFirst as $data){
    $data = str_replace(" ","_",$data);
    $data = str_replace("/","_",$data);
    $data = strtolower($data);
    $array[] =  $data;
    $values[] = str_replace("'","\'",str_replace('\\','',$getData[$i]));
    $i++;

    }
    $columns = implode(',',$array);
    $Valuess = "'".implode("','", $values)."'" ;
    $sql = "INSERT INTO dataset ($columns) VALUES ($Valuess)";
    $add = $db->query($sql);
    if($add){
     $count++;
    }
        }
   echo $count . " adet veri eklendi.";
?>
```

```php
<?php
error_reporting(E_ALL);
set_time_limit(0);
require_once "database.php";
$count = 0;
$dataset = $db->from('dataset')
  ->limit(0,300000)->all();

foreach($dataset as $data){
    if(count($db->from('incidents')
  ->where('idincidentnum',$data["incident_number"])->where('reportkey',$data["report_key"])->all()) < 1){

    $data = array_map('trim',$data);
    $data = array_map(function($value) { return str_replace("'", "\'", $value); }, $data);
    $set = array();
    $set['idincidentnum'] = $data["incident_number"];
    $timestap = strtotime($data["date"]);
    $set['date'] = date('Y-m-d',$timestap);
    if(strlen($data["time"]) > 3){
    $set['time'] = $data["time"];
    }
    $railroad_code = $data["railroad_code"];
    $railroad_name = $data['railroad_name'];


    $railroads = $db->from('railroad')->where('name',$railroad_name)->all();
    #If railroad_code exists in railroad table, just assing. Otherway insert code and name to railroad table.
    if(count($railroads) > 0){
        $set['railroad_code'] = $data["railroad_code"];
    }
    else{

       $insert = $db->query("INSERT INTO railroad (code,name) VALUES ('$railroad_code','$railroad_name')");
       $set['railroad_code'] = $railroad_code;
    }
    ##
    $set['nearest_station'] = $data["nearest_station"];
    $set['division'] = $data["division"];
    $set['subdivision'] = $data["subdivision"];
    $set['highway_name'] = $data["highway_name"];
    $set['is_public'] = $data["public_private_code"];
    #If highway_user_code exists in highway_users table, just assing. Otherway insert code and name to highway_users table.
    if(strlen($data["highway_user_code"]) > 0){
    $highway_users = $db->from('highway_users')->where('code',$data["highway_user_code"])->all();
    if(count($highway_users) > 0){
        $set['highway_user_code'] = $data["highway_user_code"];
    }
```

```
    else{
        $uc = $data["highway_user_code"];
        $us = $data["highway_user"];
        $insert = $db->query("INSERT INTO highway_users (code,name) VALUES ('$uc','$us')");

       $set['highway_user_code'] = $data["highway_user_code"];
    }
    }



    ##
    #If highway_user_position_code exists in highway_positions table, just assing. Otherway insert code and name to highway_positions table.
    if($data["highway_user_position_code"]!="" && strlen(@$data["highway_user_position_code"]) > 0 && isset($data["highway_user_position_code"])){
    $highway_positions = $db->from('highway_positions')->where('code',$data["highway_user_position_code"])->all();

    if(count($highway_positions) > 0){

        $set['highway_positions_code'] = $data["highway_user_position_code"];
    }
    else{
        $uc = $data["highway_user_position_code"];
        $us = $data["highway_user_position"];
        $insert = $db->query("INSERT INTO highway_positions (code,name) VALUES ('$uc','$us')");

       $set['highway_positions_code'] = $data["highway_user_position_code"];
    }
    }

    ##
    if(strlen($data["state_code"]) > 0){
    #State.
    $state = $db->from('state')->where('code',$data["state_code"])->all();

    if(count($state) > 0){

        $state_code = $data["state_code"];
    }
    else{
        $uc = $data["state_code"];
        $us = $data["state_name"];
        $insert = $db->query("INSERT INTO state (code,name) VALUES ('$uc','$us')");
        $state_code = $data["state_code"];
    }

    #County.
    if($data["county_name"]!="" && strlen(@$data["county_name"]) > 5 && isset($data["county_name"])){
```