



ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ

ΣΧΟΛΗ ΗΛΕΚΤΡΟΛΟΓΩΝ ΜΗΧΑΝΙΚΩΝ ΚΑΙ ΜΗΧΑΝΙΚΩΝ ΥΠΟΛΟΓΙΣΤΩΝ

## ΑΝΑΦΟΡΑ ΕΞΑΜΗΝΙΑΙΑΣ ΕΡΓΑΣΙΑΣ

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# ΠΕΡΙΕΧΟΜΕΝΑ

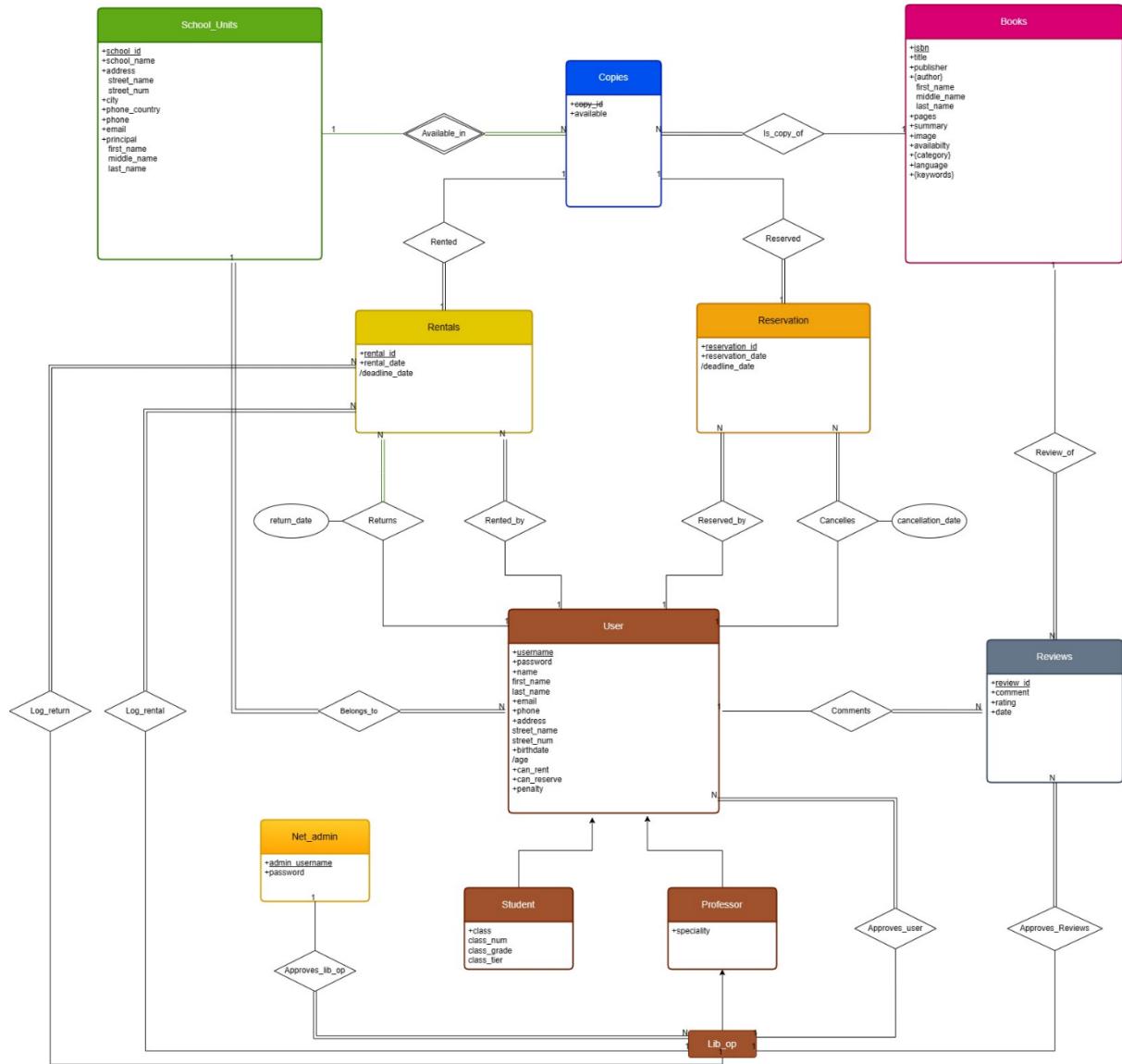
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# ΜΟΝΤΕΛΟ ΟΝΤΟΤΗΤΩΝ – ΣΥΣΧΕΤΙΣΕΩΝ

Πριν την υλοποίηση της βάσης κρίνεται απαραίτητος ο σχεδιασμός ενός μοντέλου οντοτήτων – συσχετίσεων. Καθ' αυτόν τον τρόπο καθίσταται πιο σαφές το ποιοι πίνακες θα απαρτίζουν την βάση δεδομένων, καθώς και την μεταξύ τους σχέση. Κατόπιν κατανόησης της εκφώνησης προχωρήσαμε στην δημιουργία του κάτωθι ER διαγράμματος:



## Entities

Στην τελική, καταλήγουμε στις παρακάτω οντότητες:

1. Σχολικές Μονάδες (“School\_Units”)
2. Βιβλία (“Books”)
3. Αντίτυπα (“Copies”)
4. Δανεισμοί (“Rentals”)

5. Κρατήσεις (“Reservations”)
6. Αξιολογήσεις (“Reviews”)
7. Χρήστες (“Users”)
8. Μαθητές (Students”)
9. Καθηγητές (“Professors”)
10. Χειριστές Βιβλιοθήκης (“Lib\_ops”)
11. Διαχειριστής (“Net\_Admin”).

Σε αυτό το σημείο οφείλουμε να σημειώσουμε ορισμένες παρατηρήσεις σχετικές με το σχεδιασμό του διαγράμματος:

Κατ’ αρχάς τα αντίτυπα αποτελούν weak entity στις σχολικές μονάδες. Αυτό σημαίνει πως το primary key του αποτελείται από τον συνδυασμό των attributes “copy\_id” των αντιτύπων και “school\_id” των σχολείων. Η λογική πίσω από αυτήν μας την απόφαση έγκειται στην σκέψη ότι, προτού τον σχεδιασμό της βάσης, κάθε σχολική βιβλιοθήκη ενδέχεται να είχε δικό της ξεχωριστό τρόπο απογραφής των βιβλίων που διέθετε. Κάτι τέτοιο πιθανώς να δημιουργούσε διπλότυπα. Για να μην χρειάζεται, λοιπόν, κάθε σχολική βιβλιοθήκη να αλλάξει τον τρόπο λειτουργίας της, καταλήξαμε στην παραπάνω λύση.

Κατά δεύτερον, το διάγραμμά μας ακολουθεί σχήμα εξειδίκευσης (specialization). Οι οντότητες των μαθητών και των καθηγητών είναι πιο ειδικές από αυτήν των χρηστών κι, ως εκ τούτου, κληρονομούν όλα τα attributes των τελευταίων. Παρόμοια, οι χειριστές των βιβλιοθηκών, όντας οι ίδιοι καθηγητές, αποτελούν κι αυτοί εξειδίκευση των καθηγητών κληρονομώντας όλα τους τα attributes. Ο διαχειριστής, μολονότι κι αυτός χρήστης της εφαρμογής, δεν αποτελεί εξειδίκευση τους. Αυτό συμβαίνει διότι μια τέτοια υλοποίηση θα μπορούσε να προκαλέσει λογικά σφάλματα με κληρονομούμενα attributes και relations, όπως το γεγονός ότι ο διαχειριστής θα έπρεπε να έχει εγκριθεί από κάποιον χειριστή, ο οποίος, με την σειρά του, θα έπρεπε να έχει εγκριθεί από τον διαχειριστή. Για αυτόν τον λόγο, αποφασίσαμε να ορίσουμε τον net\_admin ανεξάρτητα· να μην ανήκει, δηλαδή, σε κάποια σχολική μονάδα, αλλά να είναι κοινός για το σύνολο της βάσης.

## Attributes

Οσον αφορά, τώρα, τα attributes, λόγω αδυναμίας του προγράμματος που χρησιμοποιήσαμε για τον σχεδιασμό του διαγράμματος, δεν μπορούμε να συμβολίσουμε τα πάντα με τον παραδοσιακό τρόπο. Παραθέτουμε, λοιπόν, έναν σύντομο οδηγό των συμβολισμών που χρησιμοποιήσαμε:

- Κάθε απλό attribute συμβολίζεται με ένα ‘+’.
- Κάθε composite attribute συμβολίζεται με ένα ‘+’ και τα επιμέρους attributes που το απαρτίζουν βρίσκονται από κάτω χωρίς κανένα σύμβολο.
- Τα multivalued attributes περικλείονται μεταξύ αγκυλών (‘{}’).
- Τα derived attributes συμβολίζονται με ένα ‘/’.
- Τα primary keys υπογραμμίζονται.

- Τα attributes των weak entities τα οποία διακρίνουν τα διάφορα tuples συμβολίζονται με μία γραμμή να τα διαπερνάει (πχ. +*copy\_id*).

Πιο συγκεκριμένα, τα attributes της κάθε οντότητας ακολουθούν κατά κύριο λόγο τις οδηγίες της εκφώνησης. Ακολουθούν οι ελευθερίες που πήραμε και τα σημεία στα οποία παρεκκλίναμε:

Δεδομένου ότι οι χειριστές των βιβλιοθηκών αποτελούν χρήστες οι οποίοι συνδέονται με τις εκάστοτε σχολικές μονάδες, αποφανθήκαμε ότι δεν χρειαζόταν να προσθέσουμε τα ονόματά τους ως attributes στο school\_units, δεδομένο ένα απλό query σε μετέπειτα στάδιο του σχεδιασμού της βάσης, θα έκανε την ίδια δουλειά.

Η εκφώνηση αναφέρει για τα βιβλία να είναι εμφανής η διαθεσιμότητα τους. Όμως, καθώς οι κρατήσεις και οι δανεισμοί γίνονται στα πλαίσια σχολικής μονάδας, οι χρήστες νοικιάζουν αντίτυπα όχι τίτλους. Ως εκ τούτου μεταφέραμε το attribute της διαθεσιμότητας (“available”) στα copies. Πάλι, ένα query θα εμφάνιζε την διαθεσιμότητα σε επίπεδο βιβλίων.

Για τους χρήστες, δε, η εκφώνηση επισημαίνει την αναγκαιότητα ύπαρξης ενός username κι ενός password. Από εκεί κι έπειτα, πήραμε την ελευθερία να προσθέσουμε επιπλέον πληροφορίες για το σύνολο των users. Έτσι, λοιπόν, ορίσαμε για κάθε χρήστη, με την εγγραφή του στην βάση δεδομένων, να δίνει το ονοματεπώνυμό του, το τηλέφωνό του, το email του, την διεύθυνσή του, την ημερομηνία γέννησή του, καθώς και την ηλικία του (που αποτελεί derived attribute στο “birthdate”). Τέλος, προσθέσαμε τα “can\_rent” και “can\_reserve” τα οποία μας δείχνουν το πόσα βιβλία μπορεί να δανειστεί και να κρατήσει, αντίστοιχα, ο κάθε χρήστης, καθώς και το χαρακτηριστικό “penalty” που μας ενημερώνει για το εάν ένας δανεισμός έχει καθυστερήσει επιστροφής, οπότε κι επιβάλλεται ποινή.

Η εκφώνηση δεν απαιτεί καμιά επιπρόσθετη πληροφορία για τους μαθητές και τους καθηγητές πέρα από τις τυπικές των χρηστών. Πήραμε, λοιπόν την πρωτοβουλία να προσθέσουμε τα επιπλέον χαρακτηριστικά της τάξης στην οποία φοιτούν (“class”) οι μαθητές και το αντικείμενο (“specialty”) που διδάσκουν οι καθηγητές. Το “class” είναι composite attribute και αποτελείται από το “class\_tier” ή βαθμίδα (πχ Γυμνάσιο, Λύκειο κλπ.), το “class\_grade” ή έτος (πχ Α’, Β’, Γ’ κλπ.) και το “class\_num” ή τμήμα (πχ. 1, 2 κλπ.)

Για τον net\_admin, βέβαια, κρατήσαμε μόνο τα “admin\_username” και “password”, ενώ στους lib\_ops δεν προσθέσαμε ουδεμία επιπλέον πληροφορία.

Στις κρατήσεις τοποθετήσαμε το “rent\_date” (ημέρα διεκπεραίωσης του δανεισμού) και το derived attribute του, “deadline\_date” (προθεσμία επιστροφής), 7 μέρες μετά τον δανεισμό. Κατά παρόμοιο τρόπο γεμίζουμε την οντότητα των κρατήσεων με “reservation\_date” και “deadline\_date” (derived στο reservation\_date, 7 μέρες μετά). Ημερομηνία δημοσίευσης (“date”) βάλαμε και στις αξιολογήσεις.

Τέλος, προς διευκόλυνση διαχωρισμού των διάφορων tuples που θα ακολουθήσει σε λίγα στάδια μετά, προσθέτουμε ids ως πρωτεύοντα κλειδιά στις οντότητες των σχολείων, των αντιτύπων, των κρατήσεων, των δανεισμών και των αξιολογήσεων. Στους χρήστες και τον διαχειριστή, το username αρκεί για primary key, ενώ για τα βιβλία, κατά οδηγίες της εκφώνησης, αυτόν τον ρόλο τον λαμβάνει το “isbn”.

## Relations

Σ' αυτό το σημείο, πρέπει να αναλυθούν και οι διάφορες σχέσεις που συνδέουν τις οντότητες μεταξύ τους.

Κατ' αρχάς, τα αντίτυπα, όντας weak entity, συνδέεται με διπλό ρόμβο με το strong entity του, τις σχολικές μονάδες. Ένα σχολείο περιλαμβάνει πολλά αντίτυπα. Δεν είναι απαραίτητο ένα σχολείο να έχει αντίτυπα (μονή γραμμή) εάν, για παράδειγμα, δεν διαθέτει σχολική βιβλιοθήκη, αλλά κάθε αντίτυπο πρέπει να ανήκει σε κάποιο σχολείο (διπλή γραμμή).

Τα αντίτυπα συνδέονται με τα βιβλία μέσω του “is\_copy\_of”. Δεν είναι απαραίτητο ένα βιβλίο να έχει αντίτυπο (πχ. αν διαγραφούν όλα τα αντίτυπά του), αλλά κάθε αντίτυπο είναι απαραίτητο να είναι κάποιου βιβλίου.

Εδώ, πρέπει να σχολιάσουμε ότι θα μπορούσαμε με μία σχέση να είχαμε συνδέσει τις σχολικές μονάδες με τα βιβλία, δηλώνοντας το πτοιο τίτλοι είναι διαθέσιμοι σε κάθε σχολείο. Κάτι τέτοιο, αν και θα καθιστούσε την υλοποίηση της βάσης πιο εύκολη, δεν είναι απαραίτητο. Οπότε αποφασίσαμε να μην την συμπεριλάβουμε προς οικονομία πόρων.

Ένα αντίτυπο γίνεται μη-διαθέσιμο από μία κράτηση (“rented”). Κάθε κράτηση πρέπει να περιλαμβάνει κάποιο αντίτυπο, αλλά δεν χρειάζεται κάθε αντίτυπο να έχει κρατηθεί. Η ίδια, ακριβώς, λογική ακολουθείται και με το “reserved” που ενώνει τα αντίτυπα με τα reservations.

Οι χρήστες συνδέονται με τα rentals με δύο σχέσεις. Το “rented-by” όταν ένας χρήστης πραγματοποιεί μια κράτηση και το “returns”, όταν επιστρέφει βιβλίο. Στην τελευταία, μάλιστα, περίπτωση, επιθυμούμε να κρατήσουμε και την επιπρόσθετη πληροφορία του πότε σημειώθηκε η επιστροφή. Και στις δύο περιπτώσεις, ένας χρήστης μπορεί να κάνει πολλές κρατήσεις και κάθε κράτηση διεκπεραιώνεται αναγκαστικά από έναν χρήστη. Παρομοίως για τα “reserved\_by” και “cancels” των users με τα reservations. Μιλώντας για users, πολλοί χρήστες ανήκουν (“belongs\_to”) σε ένα, κάθε φορά σχολείο. Προφανώς έχουμε απόλυτη συμμετοχή και από τις δύο πλευρές.

Επιπλέον, κάθε χρήστη μπορεί να αξιολογήσει τα βιβλία. Αυτό στο ER μεταφράζεται με μία σχέση “comments” μεταξύ users και reviews (one to many, με total participation από μεριάς αξιολογήσεων) και μία σχέση “review\_of” (πάλι one to many με total participation από μεριάς αξιολογήσεων).

Τα βελάκια που συνδέουν students και professors με τους users και lib\_ops με professors δεν κρύβουν παρά μια σχέση τύπου “is\_a”.

Στο τέλος έχουμε τις διάφορες σχέσεις έγκρισης:

Κατ' αρχάς, ο ένας net\_admin εγκρίνει όλους τους lib\_ops. Δεν είναι απαραίτητο ο διαχειριστής να εγκρίνει κάποιον χειριστή. Όλοι οι χειριστές, τουναντίον, πρέπει να έχουν εγκριθεί από τον διαχειριστή. Με το ίδιο, ακριβώς τρόπο εγκρίνουν και οι χειριστές τους υπόλοιπους χρήστες.

Οι, δε, χειριστές έχουν τις εξής επιπρόσθετες αρμοδιότητες: να διεκπεραιώνουν δανεισμούς, επιστροφές και εγκρίσεις αξιολογήσεων. Σ' όλες, αυτές, τις περιπτώσεις έχουμε one-to-many σχέσεις (ένας χειριστής εκτελεί πολλές φορές τις εν λόγω αρμοδιότητες) με μονή γραμμή στην πλευρά του lib\_op και διπλή στην πλευρά της εκάστοτε

αρμοδιότητας. Αυτό είναι λογικό, καθώς δεν είναι απαραίτητο ο operator να διεκπεραιώσει κάποια απ' αυτές τις αρμοδιότητες, αλλά όλες οι αρμοδιότητες για να πραγματοποιηθούν πρέπει να διεκπεραιωθούν από τον operator.

Αξίζει να σημειωθεί ότι, πέρα από τα παραπάνω, η εκφώνηση αναφέρει πως ο διαχειριστής είναι υπεύθυνος για την καταχώρηση στην βάση νέων σχολείων και οι χειριστές νέων βιβλίων. Ο λόγος που δεν τα συμπεριλάβαμε στο διάγραμμα οντοτήτων – συσχετίσεων είναι επειδή οτιδήποτε καταγράφεται σε αυτό θα πρέπει στην συνέχεια με κάποιον τρόπο να εμφανιστεί στο DDL κώδικα. Οι εγκρίσεις που αναφέρθηκαν στις προηγούμενες παραγράφους, μπαίνουν στο σχεδιάγραμμα καθώς επιθυμούμε την διατήρηση κάποιου είδους ιστορικού· αλλά αυτές οι δύο τελευταίες αρμοδιότητες θα υλοποιηθούν όχι στην βάση, αλλά με τον σχεδιασμό της ιστοσελίδας. Ο, δε, λόγος για το οποίον, χρειαζόμαστε το ιστορικό, είναι επειδή τόσο οι χειριστές της βιβλιοθήκης, όσο κι ο διαχειριστής του συστήματος, μπορούν να αλλάξουν στην πορεία του χρόνου, οπότε καλό θα ήταν η διατήρηση ενός αρχείου για λόγους απόδοσης ευθυνών σε περιπτώσεις ανθρώπινου σφάλματος.

## ΣΧΕΣΙΑΚΟ ΔΙΑΓΡΑΜΜΑ

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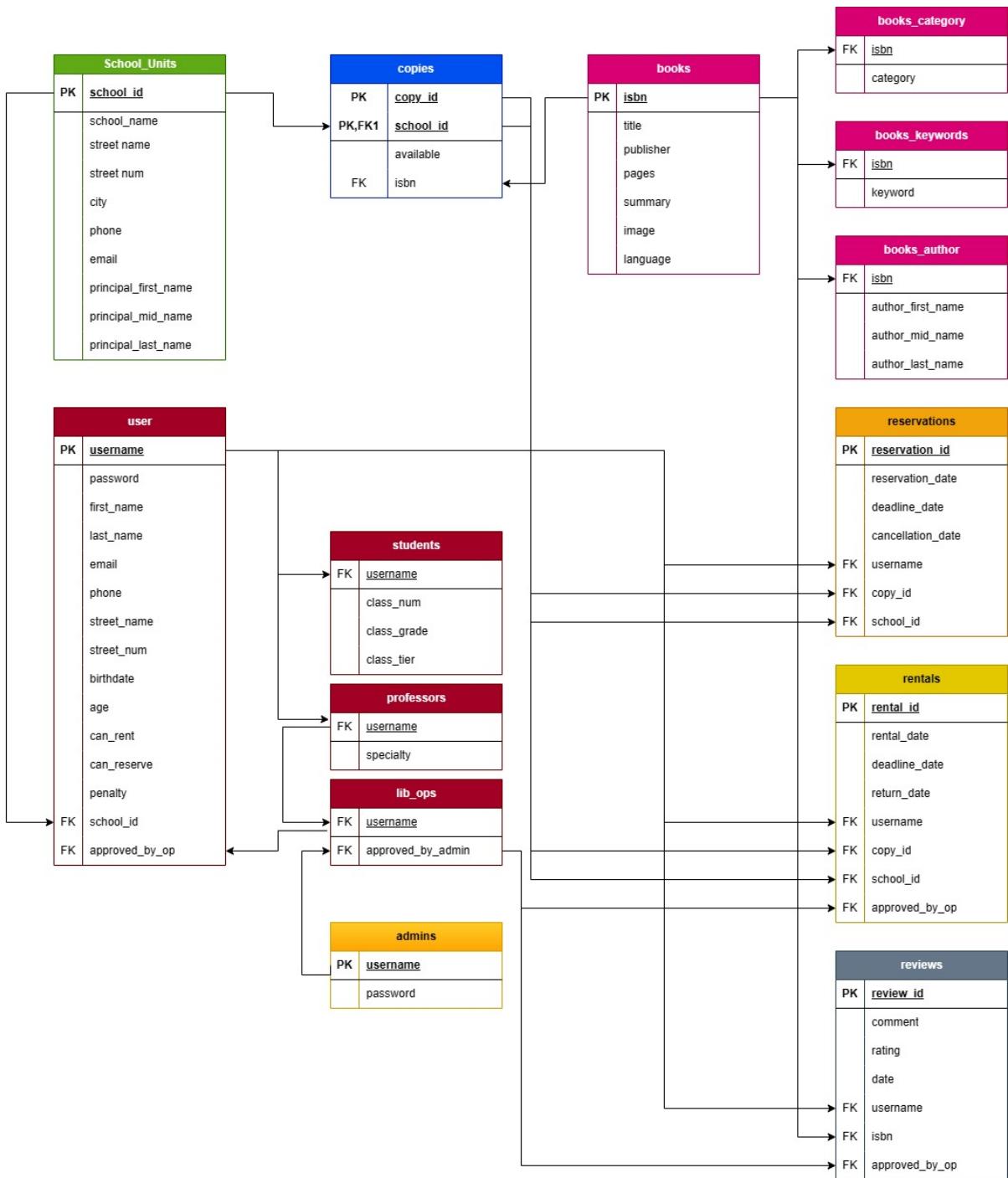
Επόμενο βήμα στον σχεδιασμό της βάσης δεδομένων είναι η μετατροπή του μοντέλου οντοτήτων – συσχετίσεων σε σχεσιακό διάγραμμα. Αυτό το βήμα, πρακτικά, περιλαμβάνει την αντικατάσταση των διαφόρων σχέσεων που περιεγράφηκαν στην προηγούμενη ενότητα από πίνακες και foreign keys. Ο τρόπος με τον οποίο γίνεται αυτό είναι, εν ολίγοις, ο εξής:

- i. Οι σχέσεις τύπου one-to-many ή many-to-one αντικαθίστανται με την προσθήκη του primary key της πλευράς του one ως attribute στην πλευρά των many.
- ii. Οι σχέσεις τύπου many-to-many αντικαθίστανται από έναν καινούριο πίνακα με attributes τα primary keys και των δύο πλευρών.
- iii. Στις σχέσεις τύπου one-to-one, οποιαδήποτε από τις δύο πλευρές μπορεί να «παίξει τον ρόλο» των many.
- iv. Τα weak entities μετατρέπονται σε κανονικούς πίνακες.
- v. Τα multivalued attributes γίνονται ξεχωριστοί πίνακες με foreign key το primary key της οντότητας στην οποία βρίσκονταν στο ER διάγραμμα.

Ακολουθώντας τις παραπάνω οδηγίες φτάνουμε στο σχεσιακό διάγραμμα της βάσης μας που απεικονίζεται στην επόμενη σελίδα.

Πράγματι, κάθε οντότητα του διαγράμματος οντοτήτων – συσχετίσεων έχει πλέον μετατραπεί σε πίνακα και κάθε attribute είναι τώρα στήλη. Παρατηρούμε, επίσης, ότι κάθε πίνακας περιλαμβάνει και ορισμένα επιπλέον columns. Πρόκειται για primary keys (PK) άλλων πινάκων με τους οποίους συνδέονταν στο ER diagram και η διαλογή γίνεται με βάση τους κανόνες που περιγράψαμε νωρίτερα. Στους νέους πίνακες έχουν λάβει τον ρόλο foreign keys (FK): εντούτοις, η σύνδεση με τις οντότητες από τις οποίες προήλθαν διακρίνεται ακόμη, μέσω της χρήσης βελών που ενώνουν τις δύο στήλες.

Πιο αναλυτικά για το συγκεκριμένο relational διάγραμμα, αξίζει να σημειωθεί πως τα multivalued attributes, “category”, “keywords” και “author” των books έχουν μετατραπεί σε ξεχωριστά tables και συνδέονται με τα βιβλία μέσω της τοποθέτησης του “isbn” ως foreign key σε αυτά. Οι εν λόγω πίνακες δεν περιέχουν πρωτεύοντα κλειδιά με την λογική ότι η παρουσία του isbn αρκεί για τον διαχωρισμό των διάφορων tuples. Την ίδια λογική περίπου ακολουθήσαμε και για τον σχεδιασμό των πινάκων των μαθητών, των καθηγητών, αλλά και των χειριστών των βιβλιοθηκών. Αποφανθήκαμε, λοιπόν, ότι ένα primary key δεν είναι απαραίτητο, καθώς το foreign key “username” από τους users είναι ικανό να διαχωρίσει τις σειρές. Επιπλέον, για τους τρείς αυτούς πίνακες, παρά το γεγονός ότι κληρονομούν όλα τα attributes των χρηστών, προς αποφυγή σπατάλης πόρων, αποφασίσαμε να μην τα επαναλάβουμε. Αντ’ αυτού και δεδομένου ότι οι τέσσερις πίνακες συνδέονται μεταξύ τους μέσω του “username”, αυτές οι επιπλέον πληροφορίες μπορούν να προσπελαστούν με διάφορους τρόπους, όταν φθάσουμε στην υλοποίηση του mysql κώδικα.



Οι στήλες “approved\_by\_op” που συναντώνται σε διάφορους πίνακες, όπως λόγου χάριν στις κρατήσεις και τις αξιολογήσεις αποτελούν foreign keys αναφερόμενα στο username του lib\_ops. Ενώ όλα τα υπόλοιπα foreign keys του διαγράμματος λαμβάνουν το ίδιο όνομα με το αντίστοιχο primary key, στις συγκεκριμένες περιπτώσεις υπάρχει ήδη το “username” ως ξένο κλειδί - παραπομπή στο users και λαμβάνει την τιμή του χρήστη που έκανε την κράτηση/αξιολόγηση κλπ. Προς αποφυγή, λοιπόν, λαθών, αλλάξαμε το όνομα της στήλης σε “approved\_by\_op”. Το ίδιο έγινε και στον πίνακα των users όπου το username είναι πρωτεύον κλειδί, ενώ η ίδια λογική ακολουθήθηκε και στο approved\_by\_admin του lib\_ops.

Τα, δε, αντίτυπα στο μοντέλο οντοτήτων και συσχετίσεων είχαν απεικονισθεί ως weak entity στις σχολικές μονάδες. Όπως είχε αναφερθεί και στην προηγούμενη ενότητα, αυτό στο relational schema μεταφράζεται σε ένα πίνακα με composite primary key: το copy\_id και το school\_id, το οποίο με την σειρά του αποτελεί foreign key σχετιζόμενο με το school\_units. Αυτός είναι και ο λόγος για το οποίον tables όπως τα rentals και τα reservations περιλαμβάνουν και τις δύο στήλες ως foreign keys.

# ΚΩΔΙΚΑΣ DDL

---

Έχοντας, πλέον, στην διάθεσή μας και το σχεσιακό διάγραμμα, βρισκόμαστε σε θέση να ξεκινήσουμε να γράφουμε τον κώδικα σε γλώσσα mysql.

Πρώτη μας μέριμνα είναι δημιουργία της βάσης δεδομένων και η οποία γίνεται με την εντολή:

*create database library;*

Αυτό δεν θα λειτουργήσει στην περίπτωση που υπάρχει ήδη μια βάση δεδομένων με το ίδιο όνομα. Σε αυτήν την περίπτωση πρέπει είτε να αλλάξουμε το όνομα την καινούριας βάσης, είτε να διαγράψουμε την προηγούμενη βάση με το ίδιο όνομα, μέσω της εντολής

*drop database library;*

και κατόπιν να επαναλάβουμε την εντολή “*create database library;*”.

Για να χρησιμοποιήσουμε την νέο-δημιουργημένη βάση γράφουμε το παρακάτω:

*use library;*

Μπορούμε, τώρα, να αρχίσουμε να δημιουργούμε τα διάφορα tables τα οποία θα απαρτίζουν την βάση μας.

## Tables

Έχοντας αναφορά το relational diagram, ο πρώτος πίνακας που δημιουργείται είναι αυτός των σχολικών μονάδων

*#school\_units create*

```
create table school_units (
    school_id          char(8),
    school_name        varchar(40) not null,
    street_name        varchar(20) not null,
    street_num         int not null,
    city               varchar(20) not null,
    phone              numeric(10,0) not null,
    email              varchar(40) not null,
    principal_first_name  varchar(20) not null,
    principal_mid_name varchar(20),
```

```

principal_last_name      varchar(20) not null,
primary key (school_id),
constraint invalid_mail check (email like '%@%')
);

```

Παρατηρούμε πως δίπλα από κάθε column (πχ. school\_id, city) συμπληρώνουμε περί τίνος είδους πρόκειται. Το char(8) για το school\_id, φερ' ειπείν, σημαίνει πως πρόκειται για μια συμβολοσειρά ακριβώς 8 χαρακτήρων. Αντίστοιχα, το varchar(20) σηματοδοτεί μια συμβολοσειρά μεταβλητού μήκους, αλλά με μέγιστο πλήθος χαρακτήρων τους είκοσι. Για τα διάφορα ονόματα, όπως το όνομα της πόλεως, του διευθυντή ή του email της κάθε σχολικής μονάδας προτιμήσαμε το varchar() καθώς δεν μπορούμε να είμαστε σίγουροι για το μήκος τους, εν αντιθέσει με το school\_id. Με το σκεπτικό ότι το τελευταίο πρόκειται για έναν κωδικό ο οποίος δίνεται σε κάθε σχολείο με την πρόσθεσή του στην βάση δεδομένων, ορίσαμε ότι το μήκος του θα είναι κάθε φορά συγκεκριμένο, στους 8 χαρακτήρες. Το, δε, street\_num μπορεί να είναι οποιοσδήποτε ακέραιος αριθμός κι, ως εκ τούτου, λαμβάνει τον τύπο int (απ' το integer που σημαίνει ακέραιος). Στην Ελλάδα, το σταθερό τηλέφωνο είναι μια ακολουθία δέκα ψηφίων, οπότε και του ορίσαμε τον τύπο numeric (10, 0) που συνεπάγεται ότι πρόκειται για έναν αριθμό δέκα ακέραιων ψηφίων και μηδέν δεκαδικών.

Παρατηρούμε, επίσης, ότι, σε μερικές περιπτώσεις, προσθέτουμε δίπλα από τον τύπο της στήλης και κάποιου είδους περιορισμός. Στην συγκεκριμένη περίπτωση, όλα αφορούν το not null, που σημαίνει ότι κατά το πέρασμα των σχολικών μονάδων στην βάση δεδομένων, τα συγκεκριμένα πεδία δεν μπορούν να αφεθούν κενά.

Στην περίπτωση του school\_id η πρόσθεση του not null δεν απαιτείται, καθώς, αμέσως μετά την απαρίθμηση των στηλών, το ορίζουμε ως πρωτεύον κλειδί του εν λόγω πίνακα, οπότε αυτομάτως ορίζεται ως not null από την mysql.

Τέλος ορίζουμε και ένα επιπρόσθετο constraint: ότι άμα το email δεν είναι γραμματοσειρά με τον χαρακτήρα "@" κάπου στην μέση, τότε να πετάει μήνυμα σφάλματος "invalid\_mail".

Με παρόμοια λογική δημιουργούμε και τους υπόλοιπους πίνακες. Ακολουθούν οι χρήστες:

```
#user create
```

```

create table user (
    username          varchar(12),
    school_id        char(8),
    password          varchar(20) not null,
    first_name        varchar(20) not null,
    last_name         varchar(20) not null,
    email             varchar(40) not null,
    phone             numeric(10,0) not null,
    street_name       varchar(20) not null,

```

```

street_num           int not null,
birthdate          date not null,
age                 int,
can_rent            int not null,
can_reserve         int not null,
penalty             boolean default false,
approved_by_op      varchar(12),

```

```

primary key (username),
foreign key (school_id) references school_units(school_id),
constraint username_too_little check( length(username) >3 ),
constraint password_too_little check( length (password) >5 ) ,
constraint invalid_mail check (email like '%@%')
);

```

Εδώ βλέπουμε μερικά ακόμη στοιχεία που δεν παρατηρήσαμε κατά την δημιουργία των school\_units. Κατ' αρχάς, βλέπουμε πως το birthdate, όντας ημερομηνία, λαμβάνει τύπο date, ενώ το penalty είναι boolean που σημαίνει ότι παίρνει τιμές true ή false. Επίσης για το column του penalty ορίζουμε να παίρνει αυτόματα την τιμή false σε περίπτωση που στο εκάστοτε tuple δεν θέσουμε εμείς συγκεκριμένη τιμή. Αυτό γίνεται μέσο του “default false” και οδηγηθήκαμε σε αυτή την απόφαση από το γεγονός ότι την στιγμή που εγγράφεται ένας καινούριος χρήστης δεν μπορεί να έχει καθυστερήσει κράτησης μέσω της εφαρμογής και, συνεπώς, δεν αδυνατεί να έχει ποινή.

Κατόπιν, ορίζουμε το username ως primary key και το school\_id, που αναφέρεται στο πρωτεύον του school\_units, ως foreign key. Τέλος, παραθέτουμε τρεις επιπρόσθετους περιορισμούς: να ελέγχει το email κατά παρόμοιο τρόπο με προηγουμένως, να ελέγχει την περίπτωση που το username είναι πολύ μικρό (αυθαίρετα ορίζουμε το όριο στους τρεις χαρακτήρες), καθώς και το εάν το password είναι πολύ μικρό (αυθαίρετα ορίζουμε το όριο στους πέντε χαρακτήρες).

Αξίζει να σημειωθεί ότι, όπως έχει ήδη αναφερθεί στην προηγούμενη ενότητα, το approved\_by\_op αποτελεί foreign key στο lib\_ops. Δεδομένου, όμως, ότι αυτός ο πίνακας δεν έχει ακόμη δημιουργηθεί, οφείλουμε να κρατήσουμε αυτήν μας την σκέψη για λίγο.

#students create

```

create table students (
    username          varchar(12) unique,
    class_num         int not null,
    class_grade       varchar(20) not null,
    class_tier        varchar(20) not null,

```

```

foreign key (username) references user(username),

```

```

constraint invalid_class_num check (class_num>=0),
constraint invalid_class_tier check (class_tier in ('primary school', 'highschool', 'junior
highschool'))
);

```

Εδώ δημιουργούμε τον πίνακα των μαθητών. Ονομάζουμε το username unique προς αποφυγή διπλοτύπων και στην συνέχεια το θέτουμε foreign key με αναφορά στο username των χρηστών. Κατόπιν γράφουμε πως το class\_num (αριθμός τμήματος) δεν μπορεί να είναι αρνητικός αριθμός κι ότι το class\_tier (βαθμίδα) πρέπει να λαμβάνει υποχρεωτικά μία από τις ακόλουθες τρεις τιμές: 'primary school' (δημοτικό), 'highschool' (λύκειο) και 'junior highschool' (γυμνάσιο).

*#professors create*

```

create table professors (
username          varchar(12) unique,
specialty         varchar(20) not null,
foreign key (username) references user(username)
);

```

Παρομοίως ορίζουμε και τους καθηγητές. Το username τίθεται foreign key και unique προς αποφυγή διπλοτύπων.

*#admins create*

```

create table admins(
username          varchar(12),
password          varchar(20) not null,
first_name        varchar(12) not null,
last_name         varchar(12) not null,
primary key (username)
);

```

Με το παραπάνω κομμάτι κώδικα ορίζουμε τον πίνακα των διαχειριστών έτσι ώστε να μπορούμε, τώρα, να δημιουργήσουμε τον πίνακα των χειριστών των βιβλιοθηκών

*#lib\_ops create*

```

create table lib_ops (
username          varchar(12),
approved_by_admin varchar(12),

```

```

foreign key (username) references professors(username),
foreign key (approved_by_admin) references admins(username)
);

```

Ο παραπάνω πίνακας αποτελείται από δύο ξένα κλειδιά, το username αναφερόμενο στους καθηγητές (οι χειριστές των βιβλιοθηκών είναι καθηγητές) και το approved\_by\_admin αναφερόμενο στους διαχειριστές της βάσης δεδομένων (για να αναλάβουν καθήκοντα πρέπει να τους δοθεί το δικαίωμα από τον admin).

Έχοντας, σ' αυτό το σημείο, ορίσει και τους lib\_ops μπορούμε να ολοκληρώσουμε και την δημιουργία του πίνακα user.

```

alter user
add constraint user_approved_by_foreign_lib_op
foreign key (approved_by_op) references lib_ops(username);

```

Με το παραπάνω κομμάτι κώδικα, αλλάζουμε τον πίνακα user έτσι ώστε να θέσουμε το approved\_by\_op foreign key στο lib\_ops.

Σειρά έχουν τα βιβλία.

#books create

```

create table books (
    isbn      char(13),
    title     varchar(50) not null,
    publisher varchar(50) not null,
    pages     int,
    summary   text default 'None available',
    image     varchar(10000),
    language  varchar(20),

```

primary key (isbn)

);

Εδώ συναντάμε έναν νέο τύπο στηλών, το text για το summary, ενώ για το image βάζουμε varchar(10000) καθώς εκεί θα αποθηκεύουμε το url της εικόνας έναντι μιας πραγματικής εικόνας. Για την περίληψη, μάλιστα, θέτουμε και default τιμή το 'None available', για την περίπτωση που ο χειριστής (υπεύθυνος για την πρόσθεση τίτλων στην βάση δεδομένων) δεν παρέχει καμία περίληψη.

Ακολουθούν οι πίνακες για τα multivalued attributes των βιβλίων: των κατηγοριών, των λέξεων-κλειδιών και των συγγραφέων αντίστοιχα.

```

#books_category create

create table books_category (
    isbn                  char(13),
    category              varchar(20),
    primary key (isbn,category),
    foreign key (isbn) references books(isbn)
);

#books_keyword create

create table books_keyword (
    isbn                  char(13),
    keyword              varchar(20),
    primary key (isbn, keyword),
    foreign key (isbn) references books(isbn)
);

#books_author create

create table books_author (
    isbn                  char(13),
    author_first_name    varchar(20) not null,
    author_middle_name   varchar(20),
    author_last_name     varchar(20) not null,
    primary key(isbn,author_first_name,author_middle_name,author_last_name),
    foreign key (isbn) references books(isbn)
);

```

Και στις τρεις περιπτώσεις θέτουμε το isbn primary και foreign key που αναφέρεται στο isbn του πίνακα των βιβλίων που δημιουργήθηκε προηγουμένως. Στην περίπτωση, μάλιστα, των συγγραφέων των βιβλίων, το primary key είναι σύνθετο. Πέρα από το isbn περιέχει και τα επιμέρους ονόματα του εκάστοτε συγγραφέα. Αυτή μας η επιλογή γίνεται για να προλάβουμε τυχόν ανθρώπινο λάθος, όπου ο υπεύθυνος χειριστής βάλει δύο φορές τον ίδιο συγγραφέα για το ίδιο βιβλίο.

Με την ολοκλήρωση και των βιβλίων και των συσχετιζόμενων με αυτά πινάκων, προχωράμε στην σύνθεση των αντιτύπων ως εξής:

```

#copies create

create table copies (
    copy_id            varchar(6),

```

```

school_id          char(8),
isbn              char(13),
available         boolean default true,
primary key(copy_id, school_id),
foreign key (isbn) references books(isbn)
);

```

Για την boolean στήλη available θέσαμε default τιμή true, με το σκεπτικό ότι την στιγμή που το κάθε αντίτυπο εισέρχεται στην βάση δεδομένων δεν θα έχει κρατηθεί ή τεθεί υπό δανεισμό, οπότε θα είναι πάντα διαθέσιμο.

Επιπλέον, οφείλουμε να σημειώσουμε πως για λόγους που επισημάνθηκαν στις προηγούμενες ενότητες, το πρωτεύον κλειδί του παρόντος πίνακα απαρτίζεται από κοινού από το copy\_id που του 'χει παραχωρηθεί από την σχολική βιβλιοθήκη στην οποία ανήκει, αλλά και από το school\_id της σχολικής μονάδας στην οποία ανήκει η βιβλιοθήκη. Το, δε, isbn είναι ξένο κλειδί και αναφέρεται στο isbn των βιβλίων.

#### #reviews create

```

create table reviews (
    review_id          int auto_increment,
    username           varchar(12),
    isbn              char(13),
    comment            text not null,
    rating             int not null,
    date               date not null,
    approved_by_op     varchar(12),
primary key (review_id),
foreign key (username) references user(username),
foreign key (approved_by_op) references lib_ops(username),
foreign key (isbn) references books(isbn)
);

```

Εδώ, έχουμε το code snippet για τις αξιολογήσεις. Για το primary key, review\_id, αποφασίσαμε, απλώς, με κάθε εισαγωγή στο table, η τιμή του να αυξάνεται κατά ένα. Αυτό επιτυγχάνεται μέσω του auto\_increment. Τα username, isbn και approved\_by\_op γίνονται foreign keys που αναφέρονται στους user, books και lib\_ops, αντίστοιχα.

#### #rentals create

```

create table rentals (
    rental_id          int auto_increment,
    username           varchar(12),

```

```

copy_id          varchar(6),
school_id       char(8),
rental_date     date default curdate(),
deadline_date   date,
return_date     date,
approved_by_op  varchar(12),

primary key (rental_id),
foreign key (username) references user(username),
foreign key (approved_by_op) references lib_ops(username),
foreign key (copy_id, school_id) references copies(copy_id, school_id),
constraint return_sooner_rent check (return_date>=rental_date)
);

```

Kai σ' αυτό το σημείο, φθάνουμε στις κρατήσεις ή rentals. Οπως και στις αξιολογήσεις, έτσι και στα rentals, το primary key (εδώ το rental\_id) αυξάνεται με τις εισόδους tuples στον πίνακα. Ιδιαίτερο ενδιαφέρον εμφανίζει το τι αναγράφεται δίπλα από το rental\_date τύπου date (ημερομηνία). Ως προεπιλογή ορίζεται η curdate(), μια συνάρτηση της mysql η οποία επιστρέφει την σύγχρονη ημερομηνία. Το σκεπτικό είναι ότι, ως επί των πλείστων, οι κρατήσεις θα διεκπεραιώνονται την ίδια μέρα με την καταχώρησή τους στο σύστημα. Κατόπιν, κατονομάζουμε πρωτεύον και δευτερεύοντα κλειδιά, καθώς και τον περιορισμό 'return\_sooner\_rent' ότι το return\_date (ή ημερομηνία επιστροφής) δεν μπορεί να είναι μικρότερο του rental\_date (ή ημερομηνία δανεισμού). Τέλος, έχουμε τον κώδικα για τον ορισμό του table των reservations:

```

#reservations create

create table reservations (
    reservation_id      int auto_increment,
    username            varchar(12),
    copy_id              varchar(6),
    school_id           char(8),
    reservation_date   date default curdate(),
    deadline_date       date,
    cancellation_date   date,

primary key (reservation_id),
foreign key (username) references user(username),
foreign key (copy_id, school_id) references copies(copy_id, school_id),
constraint cancellation_later_deadline check (deadline_date>=cancellation_date)
);

```

Η δομή του εν λόγω πίνακα είναι παρόμοια με αυτήν των δανεισμών. Το reservation\_id είναι ένας ακέραιος auto\_increment και το reservation\_date γίνεται by\_default curdate(). Ξένα κλειδιά είναι το username και το composite {copy\_id, school\_id} και θέτουμε σε ισχύει τον περιορισμό ‘cancellation\_later\_deadline’ που απαγορεύει την ημερομηνία ακύρωσης να είναι μεγαλύτερη της προθεσμίας.

## Indexes

Όταν φθάσουμε στην επόμενη ενότητα που αφορά το DML, θα υπάρξουν στήλες, που μόλις ορίσαμε, που θα προσπελαύνονται πολύ πιο συχνά από άλλες. Είναι, λοιπόν, θετική πρακτική ο ορισμός ορισμένων ευρετηρίων (indexes) που αφορούν τις εν λόγω στήλες «υψηλής κίνησης», προκειμένου να μειωθεί ο χρόνος που απαιτείται για την πρόσβαση των δεδομένων αποθηκευμένων σε αυτές. Στα πλαίσια της συγκεκριμένης άσκησης ορίζουμε τα παρακάτω ευρετήρια:

```
create index idx_books_title on books (title);
create index idx_rentals_rental_date on rentals (rental_date);
create index idx_rentals_deadline_date on rentals (deadline_date);
create index idx_rentals_return_date on rentals (return_date);
create index idx_user_first_name on user (first_name);
create index idx_user_last_name on user (last_name);
create index idx_reviews_rating on reviews (rating);
create index idx_school_units_name on school_units (school_name);
create index idx_copies_available on copies (available);
create index idx_user_age on user (age);
```

Η ονομασία τους είναι ενδεικτική της στήλης την οποία αφορούν, αφού όλες ακολουθούν το μοντέλο “idx\_table\_column”. Αξίζει, επίσης να σημειωθεί ότι η mysql δημιουργεί, αυτομάτως triggers για όλα τα πρωτεύοντα και τα ξένα κλειδιά, οπότε ο επαναορισμός τους χειροκίνητα από μας δεν απαιτείται.

Για να υποδείξουμε την σημασία των indexes τρέχουμε ένα πολύ απλό query, το select \* from user, πριν και μετά τον ορισμό των indexes.

```
+-----+
63 rows in set (0.002 sec)
```

```
+-----+
63 rows in set (0.001 sec)
```

Παρατηρούμε ότι η ύπαρξη των κατάλληλων indexes μείωσε τον χρόνο που απαιτήθηκε για την προσπέλαση των δεδομένων του πίνακα στο μισό.

# ΚΩΔΙΚΑΣ DML

---

Ως αυτό το σημείο στην βάση έχουμε δημιουργήσει όλους τους πίνακες που θα χρειαστούμε, καθώς αποδεικνύει και η κάτωθι εικόνα:

Tables_in_library
admins
books
books_author
books_category
books_keyword
copies
lib_ops
professors
rentals
reservations
reviews
school_units
students
user

Με αυτόν τον τρόπο ολοκληρώσαμε το DDL κομμάτι του κώδικα ή Data Definition Language, το οποίο αφορά την δημιουργία, την διαγραφή και την αλλαγή της δομής των διάφορων structures της βάσης.

Παρόλα αυτά δεν μπορούμε απλά να γεμίσουμε τα tables με δεδομένα και να «τελειώσει η υπόθεση». Οι διάφοροι πίνακες συνδέονται μεταξύ τους και αλλαγή σε έναν από αυτούς, ενδεχομένως, να απαιτεί αλλαγή και σε άλλους. Για να είναι λειτουργική η βάση, συνεπώς, οφείλουμε να θέσουμε κάποιους αυτοματισμούς. Δομές οι οποίες αφορούν την διαχείριση των δεδομένων αποθηκευμένων στην βάση απαρτίζουν τον κώδικα DML ή Data Manipulation Language. Τέτοιες δομές μπορεί να είναι τα triggers, τα events, τα views και άλλα τα οποία θα μελετήσουμε με την σειρά.

## Triggers

Όπως αναφέραμε προ λίγου, κάποια μεταβολή στην κατάσταση ενός πίνακα της βάσης μπορεί να απαιτεί την μεταβολή σε κάποιον άλλο πίνακα ή ακόμη και στον ίδιο πίνακα ο οποίος μεταβλήθηκε. Τέτοιες μεταβολές αφορούν, παραδείγματος χάριν, την εισαγωγή ενός νέου tuple ή την ενημέρωση κάποιου συγκεκριμένου κελιού. Αυτό στην mysql γίνεται με την δημιουργία των διάφορων triggers.

Ένα trigger που μπορεί να δημιουργηθεί είναι αυτό που υπολογίζει την ηλικία ενός χρήστη. Το “age” είναι derived attribute στο “birthdate”. Αυτό σημαίνει πως ο χρήστης δεν χρειάζεται με την εγγραφή του στο σύστημα να δίνει και την ακριβή ηλικία του· η ημερομηνία γέννησής του αρκεί. Το παρακάτω trigger χρησιμοποιεί την συνάρτηση timestampdiff() της mysql έτσι ώστε να υπολογίσει την ηλικία αμέσως πριν την εισαγωγή ενός νέου χρήστη. Αξίζει να αναφερθεί ότι η timestampdiff() λαμβάνει ως ορίσματα το year που δηλώνει ότι η διαφορά θα υπολογιστεί σε έτη, το new.birthdate που είναι η εισαγόμενη ημερομηνία γέννησης και το curdate() που επιστρέφει την τρέχουσα ημερομηνία.

```
create trigger set_initial_age
before insert on user
for each row
set new.age = timestampdiff(year, new.birthdate, curdate());
```

Το επόμενο trigger, με το οποίο οφείλουμε να ασχοληθούμε είναι η αρχικοποίηση των μεταβλητών can\_rent και can\_reserve των χρηστών. Υποθέτουμε ότι με την εγγραφή ενός χρήστη δεν έχει προλάβει να λάβει καμιά ποινή, οπότε και αρχικοποιούμε με τα δύο παρακάτω triggers τα can\_reserve και can\_rent σε 2 και 1 για τους μαθητές και τους καθηγητές αντίστοιχα.

```

delimiter //
create trigger set_student_can_rent_and_can_reserve
after insert on students
for each row
begin
update user set can_rent = 2 where username=new.username;
update user set can_reserve = 2 where username=new.username;
end
//
delimiter ;

delimiter //
create trigger set_professor_can_rent_and_can_reserve
after insert on professors
for each row
if (select can_rent from user where username = new.username) = 0 then
update user set can_rent = 1 where username=new.username;
update user set can_reserve = 1 where username=new.username;
end if;
//
delimiter ;

```

Τα δύο παραπάνω triggers περιέχουν δύο queries έκαστο. Για να μην δημιουργηθεί σφάλμα λόγω της χρήσης των semicolons κάνουμε χρήση του delimiter.

Ακολουθούν τα διάφορα triggers που αυτοματοποιούν τις αλλαγές σχετικές με τις κρατήσεις, reservations, και τους δανεισμούς, “rentals”. Το πρώτο trigger με το οποίο ασχολούμαστε είναι αυτό με το οποίο ελέγχουμε αν μία κράτηση ενός βιβλίου είναι εφικτή:

```

delimiter //
create trigger rental_check_availability
before insert on rentals
for each row
begin
if (select can_rent from user where username = new.username) = 0 or (select
penalty from user where username=new.username) = true then
    signal sqlstate '45000' set message_text = 'The user cannot rent any copies.';
elseif not exists (select school_id from user where username=new.username and
school_id in (select school_id from copies where copy_id=new.copy_id) ) then
    signal sqlstate '45000' set message_text = 'The selected copy is not available in
the users school';

```

```

elseif exists (select username from reservations where username=new.username
and cancellation_date is NULL and copy_id=new.copy_id and
school_id=new.school_id)
then
update reservations set cancellation_date = curdate() where username =
new.username and copy_id = new.copy_id and school_id = new.school_id;
elseif ((select available from copies where copy_id = new.copy_id and school_id =
new.school_id)=false)
then
    signal sqlstate '45000' set message_text = 'The selected copy is not available
for rental.';
end if;
end
//
delimiter ;

```

Το άνωθεν κομμάτι κώδικα κάνεις τους εξής ελέγχους:

- i. Εάν το can\_rent του εκάστοτε χρήστη είναι ίσο με το 0 ή εάν του έχει επιβληθεί καμιά πιηγή τότε να εκτυπωθεί μήνυμα σφάλματος “The user cannot rent any copies.”
- ii. Εάν ο χρήστης πάει να δανειστεί κάποιο αντίτυπο που δεν υπάρχει στην σχολική μονάδα στην οποία ανήκει τότε να εκτυπωθεί το μήνυμα σφάλματος: “The selected copy is not available in the users school”
- iii. Εάν το αντίτυπο που ετοιμάζεται να τεθεί υπό δανεισμό δεν είναι διαθέσιμο την δεδομένη χρονική στιγμή τότε να εκτυπωθεί το μήνυμα σφάλματος: “The selected copy is not available for rental.”
- iv. Τέλος, εάν η κράτηση που ελέγχουμε είναι αποτέλεσμα προηγούμενης κράτησης τότε να συμπληρωθεί στην στήλη cancellation\_date της εν λόγω κράτησης η τρέχουσα ημερομηνία που υποθέτουμε ότι είναι και η ημερομηνία διεκπεραίωσης του δανεισμού.

Εδώ, καλό θα ήταν να κοντοσταθούμε και να κάνουμε μια μικρή σημείωση για τον έλεγχο (iii). Στην εκφώνηση της εξαμηνιαίας άσκησης αναφέρεται πως στην περίπτωση που δεν υπάρχει διαθέσιμο αντίτυπο ενός βιβλίου, τότε η κράτηση του χρήστη μπαίνει σε αναμονή έως ότου κάποιο αντίτυπο γίνει εκ νέου διαθέσιμο. Έχοντας στο νου ότι ένας δανεισμός μπορεί να διεκπεραιωθεί μόνο δια ζώσης, καταλήξαμε στην απόφαση πως, σε μια τέτοια περίπτωση, ο υπεύθυνος της βιβλιοθήκης θα πρέπει να περάσει εκ νέου την αίτηση δανεισμού του χρήστη ως κράτηση, αυτή τη φορά, και μάλιστα ανενεργή. Με άλλα λόγια, δανεισμός βιβλίου δίχως διαθέσιμο αντίτυπο εκτυπώνει σφάλμα· κράτηση βιβλίου δίχως διαθέσιμο αντίτυπο (θα υλοποιηθεί σε άλλο trigger) είναι εφικτή.

Για λόγους, ελέγχου, καλούμαστε, επίσης, να υπολογίσουμε και την προθεσμία επιστροφής πριν την καταχώρηση μιας γραμμής στον πίνακα των δανεισμών. Ο τρόπος με τον οποίο το επιτυγχάνουμε αυτό είναι ο παρακάτω:

```

create trigger compute_rentals_deadline_date
before insert on rentals
for each row
set new.deadline_date = date_add(new.rental_date, interval 7 day);

```

όπου χρησιμοποιούμε την συνάρτηση date\_add της mysql για να προσθέσουμε 7 μέρες στην ημερομηνία διεκπεραίωσης του δανεισμού.

```

delimiter //
create trigger rental_check_title
before insert on rentals
for each row
begin
if exists (select * from copies where copy_id = new.copy_id and isbn in (select b.isbn
from books b join copies c on c.isbn = b.isbn join reservations r on r.copy_id =
c.copy_id where r.username = new.username and r.cancellation_date is null union all
select b.isbn from books b join copies c on c.isbn = b.isbn join rentals l on l.copy_id =
c.copy_id where l.username = new.username and return_date is null)) then
    signal sqlstate '45000' set message_text = 'The user cannot rent any more copies from the same book he has already rented';
end if;
end
//
delimiter ;

```

Το άνωθεν, δε, code snippet δεν επιτρέπει σε κάποιον χρήστη να νοικιάσει κάποιο αντίτυπο βιβλίου για το οποίο εκκρεμεί ακόμη δανεισμός ή κράτηση από τον ίδιο χρήστη. Εάν εντοπιστεί καμιά τέτοια περίπτωση, θα εκτυπώνεται το κατάλληλο μήνυμα σφάλματος: “The user cannot rent any more copies from the same book he has already rented”

Σε αυτό το σημείο, πρέπει να αναλογιστούμε ότι εφόσον ένας χρήστης έχει κάθε δικαίωμα δανεισμού και ο δανεισμός καταχωρηθεί επιτυχώς στον αντίστοιχο πίνακα, τότε ορισμένες τιμές, που αφορούν το available των copies και το can\_rent, πρέπει να μεταβληθούν αυτομάτως. Το πρώτο γίνεται false και το δεύτερο ελαττώνεται κατά ένα:

```

delimiter //
create trigger rental_set_availability_and_can_rent
after insert on rentals
for each row
begin
update copies set available=false
where copy_id=new.copy_id and school_id=new.school_id;
update user set can_rent=can_rent-1 where username=new.username;
end
//
delimiter ;

```

Από την άλλη πλευρά, εάν επιστραφεί ένα βιβλίο, πρέπει να επαναφέρουμε το available του επιστραφέντος αντιτύπου στην τιμή true. Ο λόγος που δεν αυξάνουμε και την τιμή του can\_rent είναι επειδή, ούτως η άλλως, η τιμή του θα ανανεώνεται κάθε βδομάδα (αυτό το τελευταίο πρόκειται για event και θα εξεταστεί στην επόμενη ενότητα.):

```
delimiter //
create trigger copy_returned_change_availability
after update on rentals
for each row
begin
if new.return_date is not null then
update copies set available=true
where copy_id=new.copy_id and school_id=new.school_id;
end if;
end
//
delimiter ;
```

Όσον αφορά τα triggers των reservations, ακολουθούν, ως επί των πλείστων, την λογική αυτών των rentals που προηγήθηκαν.

Έχουμε, δηλαδή, πρωταρχικά, να ελέγχουμε αν μία κράτηση είναι εφικτή σύμφωνα με τους όρους και της προϋποθέσεις του δικτύου σχολικών βιβλιοθηκών που σχεδιάσουμε:

```
delimiter //
create trigger reservation_check
before insert on reservations
for each row
begin
if (select can_reserve from user where username = new.username) = 0 or (select
penalty from user where username=new.username) = true
then
    signal sqlstate '45000' set message_text = 'The user cannot reserve any cop-
ies.';
elseif not exists (select school_id from user where username=new.username and
school_id in (select school_id from copies where copy_id=new.copy_id) )
then
    signal sqlstate '45000' set message_text = 'The selected copy is not available in
the users school';
end if;
end
//
delimiter ;
```

Όπως και στα rentals, έτσι και εδώ, προτού γίνει κάποια εισαγωγή στον πίνακα των reservations, ελέγχουμε εάν το can\_reserve ισούται με 0, εάν υπάρχει ποινή ή εάν το αντίτυπο και ο χρήστης δεν ανήκουν στην ίδια σχολική μονάδα. Σε κάθε περίπτωση εκτυπώνεται το κατάλληλο μήνυμα σφάλματος.

```

delimiter //
create trigger reservation_check_title
before insert on reservations
for each row
begin
if exists (select * from copies where copy_id = new.copy_id and isbn in (select b.isbn
from books b join copies c on c.isbn = b.isbn join reservations r on r.copy_id =
c.copy_id where r.username = new.username and r.cancellation_date is null union
all select b.isbn from books b join copies c on c.isbn = b.isbn join rentals l on
l.copy_id = c.copy_id where l.username = new.username and return_date is null))
then
    signal sqlstate '45000' set message_text = 'The user cannot rent any more
copies from the same book he has already rented';
end if;
end
//
delimiter ;

```

Εδώ, εν αντιθέσει με το “rental\_check\_availability”, ο έλεγχος περί μη διαθεσιμότητας κάποιου αντίτυπου δεν πραγματοποιείται για λόγους που εξηγηθήκαν παραπάνω. Το παραπάνω trigger, σε πλήρη αντιστοιχία με το “rental\_check\_title” αποτρέπει κάπιον χρήστη από το να κρατήσει αντίτυπο βιβλίου για το οποίο έχει ήδη κρατήσει ή δανειστεί ένα άλλο αντίτυπο. Το παρακάτω, δε, trigger υπολογίζει την καταληκτική ημερομηνία (deadline\_date) μετά το πέρας της οποίας, η εν λόγω κράτηση ακυρώνεται αυτομάτως.

```

create trigger compute_reservation_deadline_date
before insert on reservations
for each row
set new.deadline_date = date_add(new.reservation_date, interval 7 day);
Ta δύο trigger που ακολουθούν ελαττώνουν κατά ένα το can_reserve και θέτουν το available του κρατημένου copy σε false, εάν μια καταχώρηση κράτησης κριθεί επιτυχής, και επαναφέρουν το available σε true, εάν κάποια κράτηση ακυρωθεί.

delimiter //
create trigger reservation_set_availability_and_can_reserve
after insert on reservations
for each row
begin
update copies set available=false
where copy_id=new.copy_id and school_id=new.school_id;
update user set can_reserve=can_reserve-1 where username=new.username;
end
//
delimiter ;

```

```

delimiter //
create trigger copy_cancelled_change_availability
after update on reservations
for each row
begin
if new.cancellation_date is not null then
update copies set available=true
where copy_id=new.copy_id and school_id=new.school_id;
end if;
end
//
delimiter ;

```

Όπως, αναφέραμε και στην περίπτωση του “copy\_returned\_change\_availability”, η ακύρωση μίας κράτησης δεν προκαλεί αύξηση του can\_reserve καθώς η τιμή του ανανεώνεται κάθε εβδομάδα για κάθε χρήστη της εφαρμογής (ξανά, η υλοποίηση του event στο οποίο αναφερόμαστε θα εξεταστεί στην επόμενη υπό-ενότητα).

Τέλος, οφείλουμε να σχεδιάσουμε ένα trigger το οποίο θα αίρει κάποιο τυχόν penalty. Αυτό συμβαίνει όταν κάποιος χρήστης επιστρέψει όλα τα βιβλία τα οποία είχε καθυστερήσει να επιστρέψει:

```

delimiter //
create trigger reset_penalty
after update on rentals
for each row
if (select count(*) from rentals where username = new.username and return_date is
null and timestampdiff(day, rental_date, curdate())>7)=0 then
update user u join rentals l on u.username = l.username set u.penalty = false where
u.penalty = true and l.return_date is not null;
end if;
//
delimiter ;

```

## Events

Πέρα από τους αυτοματισμούς, όμως, που προκαλούνται με κάποια μεταβολή στην κατάσταση ενός πίνακα, υπάρχουν και εκείνοι οι αυτοματισμοί οι οποίοι πρέπει να ενεργοποιούνται ανά τακτά χρονικά διαστήματα. Αυτήν την δυνατότητα μας την δίνουν τα events. Για να μπορέσουν να λειτουργήσουν, ωστόσο, πρέπει, πρώτα, να γράψουμε αυτήν την εντολή:

```
set global event_scheduler = ON;
```

Από δω και μπρος, όλα τα events που θα δημιουργήσουμε θα ενεργοποιούνται ανάλογα με το χρονικό διάστημα που του ορίζουμε, δοθέντος ότι η βάση δεδομένων παραμένει ανοιχτή και λειτουργική.

Ένα τέτοιο event που υλοποιούμε είναι το ‘compute\_age’ το οποίο κάθε μέρα ελέγχει τις ημερομηνίες γέννησης κάθε χρήστη προκειμένου να αλλάξει την τιμή του age σε περίπτωση τυχαίνει να έχει γενέθλια:

```
create event compute_age  
on schedule every 1 day do  
update user set age = timestampdiff (year, birthdate, curdate());
```

Παρατηρούμε πως η υλοποίηση του εν λόγω event είναι παρόμοια με εκείνου του trigger που υπολόγιζε την ηλικία κάθε νέο-εισαχθέντος user.

```
create event update_can_rent_and_reserve_students  
on schedule every 7 day starts current_timestamp do  
update user u join students s on s.username = u.username set u.can_rent = 2,  
u.can_reserve=2;
```

Το παραπάνω, δε, event ανανεώνει κάθε βδομάδα τα can\_rent και can\_reserve όλων των μαθητών στα 2. Όπως αναφέρθηκε και στην υπό-ενότητα των triggers, ο έλεγχος του εάν ένας χρήστης έχει λάβει ποινή γίνεται μέσω της τιμή του penalty, οπότε και μπορούμε να ανανεώνουμε τα can\_rent και can\_reserve ανεξαρτήτως εάν κάποιος δανεισμός έχει καθυστερήσει επιστροφής. Με την ίδια λογική ανανεώνουμε τις αντίστοιχες τιμές για τους καθηγητές:

```
create event update_can_rent_and_reserve_professors  
on schedule every 7 day starts current_timestamp do  
update user u join professors p on p.username = u.username set u.can_rent = 1,  
u.can_reserve=1;
```

Το επόμενο event που οφείλουμε να δημιουργήσουμε είναι εκείνο το οποίο ακυρώνει αυτομάτως μια κράτηση με το πέρας της μίας εβδομάδας:

```
create event check_reservation_deadline  
on schedule every 1 day starts current_timestamp do  
update reservations set cancellation_date = deadline_date where cancellation_date  
is null and deadline_date <= curdate();
```

Ο τρόπος που το επιτυγχάνουμε είναι μεταβάλλοντας κάθε μέρα την τιμή των cancellation\_date στην τρέχουσα ημερομηνία στις περιπτώσεις που το cancellation\_date είναι null και παρέλθει η προθεσμία.

Με τον ίδιο τρόπο ελέγχουμε και την περίπτωση που παρέλθει η προθεσμία επιστροφής κάποιου δανεισμένου βιβλίου. Η διαφορά είναι ότι εδώ, αντί να ακυρώνουμε αυτομάτως τον δανεισμό, θέτουμε την τιμή του penalty σε true στον κατάλληλο χρήστη:

```
create event check_penalty  
on schedule every 1 day starts current_timestamp do  
update user u join rentals l on u.username = l.username set u.penalty = true where  
l.return_date is null and l.deadline_date <= curdate();
```

## Dummy Data

Έχοντας, δημιουργήσει πίνακες, triggers και events, βρισκόμαστε σε θέση να γεμίσουμε την βάση μας με δεδομένα. Παίρνουμε, λοιπόν, έναν – έναν τους πίνακες και τους εναποθέτουμε dummy data (τα δεδομένα παρήχθησαν με την χρήση A.I. από την ιστοσελίδα [Mockaroo - Random Data Generator and API Mocking Tool | JSON / CSV / SQL / Excel](#))

Έτσι, λοιπόν, έχουμε για τις σχολικές μονάδες (5 entries):

```
insert into school_units (school_id, school_name, street_name, street_num, city, phone, email, principal_first_name, principal_mid_name, principal_last_name) values ('cg4o9lmy', 'Jaxworks', 'Bartelt', 40931, 'Zapala', 8711749771, 'agent0@wired.com', 'Gustav', 'Adrienne', 'Gent');  
insert into school_units (school_id, school_name, street_name, street_num, city, phone, email, principal_first_name, principal_mid_name, principal_last_name) values ('0p8ju3vq', 'Katz', 'Petterle', 26485, 'Kula', 7141442814, 'flotte1@list-manage.com', 'Vally', 'Felecia', 'Lotte');  
insert into school_units (school_id, school_name, street_name, street_num, city, phone, email, principal_first_name, principal_mid_name, principal_last_name) values ('cbnx7ywj', 'Bubblemix', 'Packers', 13779, 'Lang Suan', 2381264382, 'vellett2@icq.com', 'Chelsey', 'Viv', 'Ellett');  
insert into school_units (school_id, school_name, street_name, street_num, city, phone, email, principal_first_name, principal_mid_name, principal_last_name) values ('l0xrbdy6', 'Kwilith', 'Clemons', 72417, 'Voloka', 7603517186, 'ijantet3@technorati.com', 'Peggi', 'Ilene', 'Janett');  
insert into school_units (school_id, school_name, street_name, street_num, city, phone, email, principal_first_name, principal_mid_name, principal_last_name) values ('6e3w27za', 'Feedmix', 'Claremont', 64801, 'Valle de Angeles', 9054343772, 'ibordis4@addtoany.com', 'Anabel', 'Ingrim', 'Bordis');
```

Για τους χρήστες (63 entries):

```
insert into user (username, school_id, password, first_name, last_name, email, phone, street_name, street_num, birthdate) values ('oscar', 'cbnx7ywj', 'kqSyfbHU', 'Domeniga', 'Derycot', 'dderycot0@naver.com', 7679411979, 'Sherman', 99, '1999-03-03');  
insert into user (username, school_id, password, first_name, last_name, email, phone, street_name, street_num, birthdate) values ('laura', '0p8ju3vq', 'oJcQSnrF', 'Coriss', 'Garrard', 'cgarrard1@xinhuanet.com', 3470025784, 'Reinke', 69, '2018-01-14');  
insert into user (username, school_id, password, first_name, last_name, email, phone, street_name, street_num, birthdate) values ('peter', 'cg4o9lmy', 'CE0XVCON', 'Delphinia', 'Ateggart', 'dateggart2@hc360.com', 5599912309, 'Menomonie', 11, '1933-05-15');  
insert into user (username, school_id, password, first_name, last_name, email, phone, street_name, street_num, birthdate) values ('johndoe', 'l0xrbdy6', 'LK0aZ6LbVWib', 'Sibel', 'Filshin', 'sfilshin4@hud.gov', 6715325232, 'Sage', 38, '1983-06-27');  
insert into user (username, school_id, password, first_name, last_name, email, phone, street_name, street_num, birthdate) values ('mark', 'l0xrbdy6', 'GP1A4Pyk0k', 'Keelia', 'Witcombe', 'kwitcombe5@comcast.net', 5135203725, 'Kedzie', 51, '1999-10-19');
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insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('johndore', 'cg4o9lmy',
'BHXRd5r', 'Alleyn', 'McCillis', 'amccillis6@ameblo.jp', 8984187322, 'Debra', 45,
'1971-02-10');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('leah', 'cg4o9lmy', 'NPe5NRJTi',
'Florance', 'Smitham', 'fsmitham7@shinystat.com', 4547709223, '3rd', 99, '2003-05-
10');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('rachel', 'l0xrbdy6',
'7x8G2KjwmYL8', 'Otha', 'Karet', 'okaret8@uiuc.edu', 2162231408, 'Sheridan', 55,
'1958-06-27');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('kimberly', 'cg4o9lmy', 'MfrqrGv',
'Brod', 'Twiname', 'btwiname9@toplist.cz', 3823271359, 'Kensington', 27, '2022-01-
16');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('robert', '0p8ju3vq', 'knTud0JD3',
'Raven', 'Gillson', 'rgillsona@virginia.edu', 9329006606, 'Clyde Gallagher', 65, '1992-
07-14');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('nathan', '6e3w27za',
'sFT7KpmAkB', 'Derby', 'Andreini', 'dandreinib@bloglovin.com', 8835087903, 'Bay-
side', 20, '1973-02-11');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('michael', '6e3w27za',
'A3QFzjmlr', 'Lissie', 'MacQuaker', 'lmacquakerc@smugmug.com', 8582205580,
'Crownhardt', 51, '2005-06-17');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('celly', 'l0xrbdy6', 'RdnbkQf', 'Nis-
sie', 'Laker', 'nlakerd@cnbc.com', 1181229052, 'Messerschmidt', 43, '2013-10-18');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('jackson', 'l0xrbdy6', 'yEMdo0',
'Elizabet', 'Shoebotham', 'eshoebothame@whitehouse.gov', 8142355349, 'Gateway',
11, '2018-02-02');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('markos', 'l0xrbdy6', '049y2tU-
UrA', 'Bobby', 'Tirte', 'btirtef@nytimes.com', 7874358480, 'Michigan', 11, '1935-10-
11');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('janedoe', '6e3w27za',
'tqFDUohXb', 'Robin', 'Gerish', 'rgerishg@marriott.com', 5631319099, 'Loomis', 69,
'1952-09-29');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('matthew', 'cg4o9lmy',
'YEleKAOi', 'Angel', 'Vasyukov', 'avasyukovh@pen.io', 1722916993, 'Petterle', 49,
'1957-08-21');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('rachell', 'l0xrbdy6', 'eyI0tR8',
'Tabbie', 'Sans', 'tsansi@ow.ly', 4656544750, 'Fairview', 90, '1976-04-30');

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insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('natallie', 'cbnx7ywj',
'IG0FfDUC3sZC', 'Juditha', 'Cosens', 'jcosensj@google.com', 7999081947, 'Blaine',
15, '2016-06-01');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('lissa', '0p8ju3vq', 'wOy1IP', 'Dallas',
'Lourenco', 'dlourencok@ycombinator.com', 5566013965, 'Oak Valley', 74,
'1903-07-05');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('rebecca', 'cbnx7ywj', 'b40tb6',
'Emmalyn', 'Haythorn', 'ehaythornl@archive.org', 3081636031, 'Bashford', 15, '1909-
05-25');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('logan', 'cbnx7ywj',
'GC0jJDCy8b', 'Magdaia', 'Bage', 'mbagem@dion.ne.jp', 4024488308, 'Vidon', 8,
'1920-03-22');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('migel', 'cbnx7ywj', 'ul3f6F', 'Za-
hara', 'Unitt', 'zunittn@quantcast.com', 7978319532, 'West', 57, '1989-05-18');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('lance', 'cbnx7ywj', 'Kxpbzu',
'Tuckie', 'Dabels', 'tdabelso@networkadvertising.org', 3079770716, 'Norway Maple',
6, '1976-03-05');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('oscar69', '6e3w27za', 'oJs-
WyY2', 'Ruben', 'Dunlop', 'rdunlopp@webnode.com', 7652164516, 'Walton', 96,
'1917-10-11');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('laurel', 'l0xrbdy6', 'DF6IkIKfH-
VAq', 'Belita', 'Green', 'bgreenq@delicious.com', 9995662095, 'Fulton', 80, '1964-8-
11');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('natalie', '0p8ju3vq', 'e90IED',
'Darnell', 'Esposita', 'despositar@ifeng.com', 9086783439, 'Lien', 59, '1924-11-02');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('donkeykong', '0p8ju3vq',
'Hq3XubK', 'Rudolf', 'Bursnoll', 'rbursnolls@dedecms.com', 8286635508, 'Meadow
Vale', 58, '1956-03-22');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('kattie', '6e3w27za', 'XyVfx5D',
'Baxy', 'Backes', 'bbackest@comsenz.com', 3033855436, 'Crest Line', 67, '1950-07-
30');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('lucas', 'cg4o9lmy', 'ZIRSoGhS',
'Rasla', 'Keilloh', 'rkeillohu@cocolog-nifty.com', 1463445254, 'Tennessee', 7, '1962-
04-06');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('karla', 'l0xrbdy6', 'cFwayZF-
Shc8A', 'Roarke', 'Awde', 'rawdev@blog.com', 3152972097, 'Bowman', 36, '1956-07-
02');

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insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('jessicca', '0p8ju3vq',
'84Vkk8gqsY', 'Me!', 'Offiler', 'moffilerw@dyndns.org', 5129605009, 'Namekagon', 76,
'1941-09-20');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('oliver', '0p8ju3vq', 'eX79YIU',
'Darbee', 'Minnock', 'dminnockx@wikimedia.org', 4770954791, 'Russell', 47, '1959-
07-05');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('olivia', 'cg4o9lmy',
'3mgFBih7sSk6', 'Micaela', 'Loseby', 'mlosebyy@newsvine.com', 1864120277, 'War-
bler', 51, '1933-12-20');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('melissa', 'cg4o9lmy', 'b0IT8JL',
'Guinevere', 'Deville', 'gdevillez@macromedia.com', 8234183393, 'Monica', 73,
'1910-05-16');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('kimber', '6e3w27za',
'13PpTpyr9j', 'Linda', 'Swatton', 'lswatton10@mlb.com', 7604942616, 'Springview',
80, '1938-03-15');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('nick', 'cg4o9lmy', 'tMdnsPbELU',
'Yorke', 'Dwane', 'ydwane11@mac.com', 8046944622, 'Surrey', 10, '1943-08-17');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('user123', 'cg4o9lmy', 'CU-
vMd7mc', 'Luise', 'Praton', 'lpraton12@hc360.com', 6941753171, 'Bashford', 79,
'2008-04-07');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('patrick', 'cg4o9lmy',
'EUz5TgK5rjd', 'Isidore', 'Stainton', 'istainton13@t-online.de', 7903334726,
'Springview', 93, '1920-09-16');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('lisasa', 'cbnx7ywj', '3zXzbxO3y',
'Marion', 'O"Kielt', 'mokielt14@ning.com', 9172872132, 'Westridge', 86, '1901-12-
10');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('ryan', '0p8ju3vq', 'LdwLJXXky',
'Victoir', 'Crookston', 'vcrookston15@bizjournals.com', 2684928143, 'Tennyson', 57,
'1967-10-12');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('rebecca', '0p8ju3vq',
'LhX9XGZzmUC', 'Sidney', 'Whales', 'swhales16@opensource.org', 1676026885,
'Bluestem', 27, '2017-08-29');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('kati', '0p8ju3vq', 'Pymx1oj0Z',
'Lauritz', 'Veness', 'lveness17@berkeley.edu', 9860198079, 'Oak', 81, '1982-11-15');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('just_in', 'cbnx7ywj', 'wZ0rOzsvh',
'Jilleen', 'Daveran', 'jdaveran18@xinhuanet.com', 1556666046, 'Eagan', 6, '1926-11-
01');

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insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('roberto', 'cbnx7ywj',
'Uz2VaEPGXXr', 'Reinald', 'Lehrahan', 'rlehrahan19@comcast.net', 5378720137,
'Northridge', 23, '2009-06-29');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('janedore', '6e3w27za', 'WHfIOT-
MSPC', 'Warde', 'Lapslie', 'wlapslie1a@telegraph.co.uk', 3728897494, 'Hermina', 19,
'2000-06-17');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('jessica_p', 'cg4o9lmy',
'CWdpdV0quy', 'Germayne', 'Rubenfeld', 'grubenfeld1b@sina.com.cn', 1926246097,
'Cottonwood', 17, '2001-12-22');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('jimy', 'cg4o9lmy', 'UMDvxKf',
'Henrie', 'Clousley', 'hclousley1c@slashdot.org', 7789343389, 'Butterfield', 10, '1937-
06-21');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('liza', 'cg4o9lmy',
'B3LTVBRSz6g', 'Jule', 'Yarwood', 'jyarwood1d@nih.gov', 9438519725, 'Fisk', 97,
'2015-08-10');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('nathan_drake', 'l0xrbdy6',
'trpCG5G', 'Gard', 'Bonellie', 'gbonellie1e@newyorker.com', 2008364042, 'Cordelia',
76, '1984-05-16');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('jasson', '6e3w27za',
'XwbBJXcxaKj', 'Hercule', 'Handlin', 'hhandlin1f@meetup.com', 7874119894, 'Amoth',
1, '1996-11-12');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('paulaner', 'cg4o9lmy',
'2tv0hZAbCi', 'Dickie', 'Winn', 'dwinn1g@booking.com', 6954868686, 'Pearson', 39,
'1965-08-22');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('luke', '6e3w27za', 'qYla2py',
'Anna', 'Sanger', 'asanger1j@bloglovin.com', 7102265071, 'Merchant', 22, '1956-10-
16');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('paige', 'cbnx7ywj', 'pp4kga', 'Es-
tel', 'Danes', 'edanes1l@sohu.com', 8255511626, 'Del Mar', 96, '1920-06-11');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('nicko', '6e3w27za',
'5upVSBxBBrK', 'Babette', 'Windress', 'bwindress1o@yandex.ru', 9915484704, 'May-
wood', 90, '1946-05-05');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('jenny', 'l0xrbdy6', 'M1IIWAxBs',
'Miran', 'Allabush', 'mallabush1p@reuters.com', 4871677839, 'Lerdahl', 29, '1985-11-
18');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('larry', '6e3w27za',

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'v2xUR0g8eHx', 'Marianne', 'Lucken', 'mlucken1q@europa.eu', 6598197065, 'Sho-
shone', 68, '1983-05-08');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('kevin', '6e3w27za', 'Ob-
DrM96YVADS', 'Mord', 'Witch', 'mwitch1r@acquirethisname.com', 5781450804, 'Cor-
ben', 37, '1987-02-12');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('megan', 'l0xrbdy6',
'pAz4ueupwQu', 'Chad', 'Faltin', 'cfaltin1t@japanpost.jp', 6354065639, 'Surrey', 68,
'1966-05-08');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('paul', '0p8ju3vq', 'QiE7gY',
'Krishnah', 'Thraves', 'kthraves1v@tumblr.com', 9330945133, 'Birchwood', 60, '1956-
09-22');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('jason', 'cbnx7ywj',
'KBU0Gp8Bih', 'Mauricio', 'Latter', 'mlatter1w@cnn.com', 8062839684, 'Harper', 47,
'1949-08-16');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('kelly', '0p8ju3vq',
'4G9zFm18Eut', 'Gustavo', 'Butteris', 'gbutteris1x@disqus.com', 6028382335, 'Talis-
man', 44, '2011-05-21');
insert into user (username, school_id, password, first_name, last_name, email,
phone, street_name, street_num, birthdate) values ('linda', 'cg4o9lmy', 'bjf9Xnfg',
'Michal', 'Penritt', 'mpenritt1y@histats.com', 9648929178, 'Stuart', 24, '1966-03-28');

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Για τους μαθητές (53 entries):

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insert into students (username, class_num, class_grade, class_tier) values ('oscar',
3, 3, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('laura',
1, 2, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('peter',
1, 2, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('mark', 4,
2, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('leah', 2,
2, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('rachel',
5, 3, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('kimber-
ly', 2, 3, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('robert',
4, 3, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('nathan',
1, 2, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values
('michael', 3, 2, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('celly', 1,
3, 'highschool');

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insert into students (username, class_num, class_grade, class_tier) values ('jackson', 4, 2, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('jane-doe', 3, 3, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('matthew', 5, 3, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('rachell', 2, 1, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('natallie', 4, 3, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('lissa', 5, 2, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('rebecca', 2, 1, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('logan', 3, 1, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('migel', 2, 1, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('lance', 5, 1, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('oscar69', 2, 1, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('laurel', 4, 2, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('natalie', 4, 3, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('donkey-kong', 4, 3, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('lucas', 3, 2, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('jessica', 1, 1, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('oliver', 3, 1, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('olivia', 3, 1, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('melissa', 4, 1, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('kimber', 2, 3, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('nick', 5, 1, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('user123', 1, 3, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('patrick', 4, 2, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('lisasa', 3, 3, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('ryan', 5, 2, 'primary school');
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insert into students (username, class_num, class_grade, class_tier) values ('rebecca', 5, 3, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('kati', 1, 3, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('roberto', 2, 2, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('janedore', 4, 1, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('jimy', 4, 2, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('liza', 1, 1, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('nathan_drake', 2, 1, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('jasson', 1, 2, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('paulanner', 3, 2, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('luke', 2, 3, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('paige', 3, 2, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('nicko', 5, 3, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('jenny', 4, 1, 'highschool');
insert into students (username, class_num, class_grade, class_tier) values ('larry', 4, 3, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('kevin', 2, 3, 'junior highschool');
insert into students (username, class_num, class_grade, class_tier) values ('paul', 2, 1, 'primary school');
insert into students (username, class_num, class_grade, class_tier) values ('jason', 4, 3, 'junior highschool');

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Για τους καθηγητές (10 entries):

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insert into professors (username, specialty) values ('kattie', 'physics');
insert into professors (username, specialty) values ('karla', 'history');
insert into professors (username, specialty) values ('just_in', 'history');
insert into professors (username, specialty) values ('kattie', 'arts');
insert into professors (username, specialty) values ('jessica_p', 'gymnast');
insert into professors (username, specialty) values ('jessica_p', 'linguistics');
insert into professors (username, specialty) values ('kattie', 'linguistics');
insert into professors (username, specialty) values ('johndoe', 'physics');
insert into professors (username, specialty) values ('johndore', 'maths');
insert into professors (username, specialty) values ('markos', 'arts');
insert into professors (username, specialty) values ('karla', 'maths');
insert into professors (username, specialty) values ('linda', 'physics');
insert into professors (username, specialty) values ('kelly', 'physics');

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*insert into professors (username, specialty) values ('megan', 'linguistics');*

Για τα βιβλία (120 entries):

*insert into books (isbn, title, publisher, pages, summary, language) values ('2708534695379', 'Profit-focused background circuit', 'Babbleopia', 2351, 'Praesent id massa id nisl venenatis lacinia. Aenean sit amet justo. Morbi ut odio.', 'Portuguese');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('1384775782469', 'Expanded optimal methodology', 'Twimbo', 1985, 'In quis justo. Maecenas rhoncus aliquam lacus. Morbi quis tortor id nulla ultrices aliquet.', 'Thai');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('9966242290758', 'Exclusive real-time utilisation', 'Blogspan', 3372, 'Nulla ut erat id mauris vulputate elementum. Nullam varius. Nulla facilisi.', 'Persian');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('0809784979155', 'Up-sized needs-based hub', 'Yambee', 465, 'Donec diam neque, vestibulum eget, vulputate ut, ultrices vel, augue. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi. Integer ac neque.', 'Tsonga');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('9401496029041', 'Robust disintermediate time-frame', 'Oyoyo', 4438, 'Quisque id justo sit amet sapien dignissim vestibulum. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Nulla dapibus dolor vel est. Donec odio justo, sollicitudin ut, suscipit a, feugiat et, eros.', 'Tswana');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('3023607894971', 'Managed maximized matrices', 'Photobean', 1645, 'In quis justo. Maecenas rhoncus aliquam lacus. Morbi quis tortor id nulla ultrices aliquet.', 'Italian');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('5637151250435', 'Re-contextualized next generation software', 'Ntags', 1288, 'Nulla ut erat id mauris vulputate elementum. Nullam varius. Nulla facilisi.', 'Guarani');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('3801803376307', 'Fundamental methodical open architecture', 'Kare', 2770, 'Nulla ut erat id mauris vulputate elementum. Nullam varius. Nulla facilisi.', 'Indonesian');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('0311999229072', 'Customizable bottom-line attitude', 'Edgepulse', 425, 'Nullam porttitor lacus at turpis. Donec posuere metus vitae ipsum. Aliquam non mauris.', 'Zulu');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('6886890911303', 'Right-sized bottom-line attitude', 'Centimia', 898, 'Proin interdum mauris non ligula pellentesque ultrices. Phasellus id sapien in sapien iaculis congue. Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl.', 'Thai');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('1880989916727', 'Realigned zero administration emulation', 'Demizz', 2700, 'In sagittis dui vel nisl. Duis ac nibh. Fusce lacus purus, aliquet at, feugiat non, pretium quis, lectus.', 'Zulu');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('0674909573292', 'Intuitive executive moderator', 'Riffwire', 2164, 'Vestibulum ac est lacinia nisi venenatis tristique. Fusce congue, diam id ornare imperdiet, sapien urna pretium nisl, ut volutpat sapien arcu sed augue. Aliquam erat volutpat.', 'Dhivehi');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('3497871017792', 'Innovative grid-enabled matrix', 'Minyx', 3374, 'Morbi non lectus. Aliquam sit amet diam in magna bibendum imperdiet. Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis.', 'Assamese');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('4337174964178', 'Enhanced maximized leverage', 'Dazzlesphere', 2760, 'Integer tincidunt ante vel ipsum. Praesent blandit lacinia erat. Vestibulum sed magna at nunc commodo placerat.', 'Telugu');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('3233359903008', 'Managed intermediate attitude', 'Omba', 4692, 'Fusce consequat. Nulla nisl. Nunc nisl.', 'Maori');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('1849562027959', 'Implemented content-based analyzer', 'Zoomzone', 2377, 'Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Proin risus. Praesent lectus.', 'Marathi');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('2605933464940', 'Configurable value-added artificial intelligence', 'Zoovu', 1929, 'Praesent id massa id nisl venenatis lacinia. Aenean sit amet justo. Morbi ut odio.', 'Swahili');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('6665316998471', 'Centralized zero defect contingency', 'Thoughtblab', 3161, 'Proin eu mi. Nulla ac enim. In tempor, turpis nec euismod scelerisque, quam turpis adipiscing lorem, vitae mattis nibh ligula nec sem.', 'Hiri Motu');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('3434457249094', 'Horizontal 4th generation model', 'Tambee', 567, 'Fusce consequat. Nulla nisl. Nunc nisl.', 'Catalan');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('9401079679717', 'Cross-group value-added instruction set', 'Linkbridge', 976, 'Curabitur in libero ut massa volutpat convallis. Morbi odio odio, elementum eu, interdum eu, tincidunt in, leo. Maecenas pulvinar lobortis est.', 'Papiamento');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('6282535018808', 'Re-contextualized zero administration process improvement', 'Skimia', 241, 'In hac habitasse platea dictumst. Morbi vestibulum, velit id pretium iaculis, diam erat fermentum justo, nec condimentum neque sapien placerat ante. Nulla justo.', 'Dzongkha');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('9512116594361', 'Ergonomic client-server system engine', 'Myworks', 4249, 'Sed sagittis. Nam congue, risus semper porta volutpat, quam pede lobortis ligula, sit amet eleifend pede libero quis orci. Nullam molestie nibh in lectus.', 'Malayalam');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('0307793378720', 'User-centric 24 hour service-desk', 'Thoughtmix', 1458, 'Proin eu mi. Nulla ac enim. In tempor, turpis nec euismod scelerisque, quam turpis adipiscing lorem, vitae mattis nibh ligula nec sem.', 'Haitian Creole');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('6088775503660', 'Team-oriented object-oriented algorithm', 'Devshare', 4054, 'Sed sagittis. Nam congue, risus semper porta volutpat, quam pede lobortis ligula, sit amet eleifend pede libero quis orci. Nullam molestie nibh in lectus.', 'Luxembourgish');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('4825391130222', 'Compatible tangible strategy', 'Shufflebeat', 1931, 'Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Proin risus. Praesent lectus.', 'Hebrew');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('4531472543465', 'Persevering 3rd generation access', 'Skalith', 400, 'Morbi non lectus. Aliquam sit amet diam in magna bibendum imperdiet. Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis.', 'Mongolian');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('8630212258348', 'Fully-configurable asymmetric software', 'Yousbridge', 358, 'Fusce consequat. Nulla nisl. Nunc nisl.', 'Finnish');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('3054755583226', 'Integrated coherent protocol', 'Twitterwire', 3089, 'Donec diam neque, vestibulum eget, vulputate ut, ultrices vel, augue. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi. Integer ac neque.', 'Tswana');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('6424359997295', 'Realigned eco-centric infrastructure', 'Yadel', 445, 'Maecenas ut massa quis augue luctus tincidunt. Nulla mollis molestie lorem. Quisque ut erat.', 'Telugu');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('6941503348774', 'Extended tertiary core', 'Plajo', 804, 'Aenean lectus. Pellentesque eget nunc. Donec quis orci eget orci vehicula condimentum.', 'Khmer');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('4157469723312', 'Virtual high-level groupware', 'Eare', 3513, 'Phasellus in felis. Donec semper sapien a libero. Nam dui.', 'Armenian');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('5453558852834', 'Persistent holistic policy', 'Fivebridge', 3835, 'Fusce consequat. Nulla nisl. Nunc nisl.', 'Lithuanian');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('5674805785564', 'Down-sized content-based secured line', 'Minyx', 1159, 'Suspendisse potenti. In eleifend quam a odio. In hac habitasse platea dictumst.', 'Japanese');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('5998893066103', 'Progressive static function', 'Twimm', 4121, 'Pellentesque at nulla. Suspendisse potenti. Cras in purus eu magna vulputate luctus.', 'Guarani');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('5624524684158', 'Mandatory multi-state function', 'Dynabox', 3440, 'Donec diam neque, vestibulum eget, vulputate ut, ultrices vel, augue. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi. Integer ac neque.', 'French');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('5340523327623', 'Optional tertiary installation', 'Meeveo', 1358, 'Integer ac leo. Pellentesque ultrices mattis odio. Donec vitae nisi.', 'Filipino');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('9271162786673', 'Open-source systemic encoding', 'Edgeify', 2336, 'Nullam porttitor lacus at turpis. Donec posuere metus vitae ipsum. Aliquam non mauris.', 'Quechua');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('6520474320230', 'Pre-emptive national superstructure', 'Pixope', 4292, 'Integer ac leo. Pellentesque ultrices mattis odio. Donec vitae nisi.', 'Italian');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('2041197881464', 'Synergized value-added hardware', 'Eayo', 3452, 'Maecenas tristique, est et tempus semper, est quam pharetra magna, ac consequat metus sapien ut nunc. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Mauris viverra diam vitae quam. Suspendisse potenti.', 'Chinese');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('4551192150404', 'Switchable motivating model', 'Jabbersphere', 4139, 'Morbi porttitor lorem id ligula. Suspendisse ornare consequat lectus. In est risus, auctor sed, tristique in, tempus sit amet, sem.', 'Bosnian');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('2102821942056', 'Visionary radical archive', 'Youtags', 3163, 'Quisque porta volutpat erat. Quisque erat eros, viverra eget, congue eget, semper rutrum, nulla. Nunc purus.', 'Romanian');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('1887823406832', 'Integrated asymmetric capacity', 'Zoomlounge', 3984, 'Fusce posuere felis sed lacus. Morbi sem mauris, laoreet ut, rhoncus aliquet, pulvinar sed, nisl. Nunc rhoncus dui vel sem.', 'Swedish');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('0597909047825', 'Open-source human-resource circuit', 'Lajo', 1121, 'Maecenas tristique, est et tempus semper, est quam pharetra magna, ac consequat metus sapien ut nunc. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Mauris viverra diam vitae quam. Suspendisse potenti.', 'Macedonian');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('3646938530520', 'Networked reciprocal analyzer', 'Oodoo', 4221, 'Cras non velit nec nisi vulputate nonummy. Maecenas tincidunt lacus at velit. Vivamus vel nulla eget eros elementum pellentesque.', 'Bislama');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('1089728812164', 'Optimized full-range framework', 'Ailane', 3230, 'Nam ultrices, libero non mattis pulvinar, nulla pede ullamcorper augue, a suscipit nulla elit ac nulla. Sed vel enim sit amet nunc viverra dapibus. Nulla suscipit ligula in lacus.', 'Sotho');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('7355800064865', 'Programmable client-driven interface', 'Feednation', 4277, 'Pellentesque at nulla. Suspendisse potenti. Cras in purus eu magna vulputate luctus.', 'Dhivehi');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('4409786147582', 'Profound 3rd generation time-frame', 'Linklinks', 1131, 'Proin interdum mauris non ligula pellentesque ultrices. Phasellus id sapien in sapien iaculis congue. Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl.', 'Kyrgyz');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('3697186816645', 'Mandatory static process improvement', 'Yakidoo', 134, 'Vestibulum ac est lacinia nisi venenatis tristique. Fusce congue, diam id ornare imperdiet, sapien urna pretium nisl, ut volutpat sapien arcu sed augue. Aliquam erat volutpat.', 'Thai');*  
*insert into books (isbn, title, publisher, pages, summary, language) values ('5775360868585', 'Versatile upward-trending process improvement', 'Kwideo', 3456,*

*'Phasellus sit amet erat. Nulla tempus. Vivamus in felis eu sapien cursus vestibulum.', 'Pashto');*  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'5258929471531'*, '*Optimized well-modulated moderator*', '*Brainsphere*', 1563, '*Sed ante. Vivamus tortor. Duis mattis egestas metus.*', '*Tetum*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'0647432491033'*, '*Innovative real-time leverage*', '*Dynabox*', 1402, '*Duis aliquam convallis nunc. Proin at turpis a pede posuere nonummy. Integer non velit.*', '*Gujarati*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'7615837417331'*, '*Function-based directional model*', '*Mynte*', 1583, '*Proin eu mi. Nulla ac enim. In tempor, turpis nec euismod scelerisque, quam turpis adipiscing lorem, vitae mattis nibh ligula nec sem.*', '*Arabic*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'0277636020622'*, '*Compatible cohesive artificial intelligence*', '*Agivu*', 2597, '*Proin interdum mauris non ligula pellentesque ultrices. Phasellus id sapien in sapien iaculis congue. Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl.*', '*Māori*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'7801913419425'*, '*Robust web-enabled system engine*', '*Yotz*', 1316, '*Maecenas tristique, est et tempus semper, est quam pharetra magna, ac consequat metus sapien ut nunc. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Mauris viverra diam vitae quam. Suspendisse potenti.*', '*Estonian*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'3920489958474'*, '*Streamlined context-sensitive contingency*', '*Feedfish*', 180, '*Curabitur gravida nisi at nibh. In hac habitasse platea dictumst. Aliquam augue quam, sollicitudin vitae, consectetuer eget, rutrum at, lorem.*', '*Macedonian*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'0413566995950'*, '*Open-architected fresh-thinking support*', '*Blogtags*', 985, '*Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Proin risus. Praesent lectus.*', '*Dari*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'4674500211287'*, '*Monitored asynchronous project*', '*Flipstorm*', 1096, '*Duis aliquam convallis nunc. Proin at turpis a pede posuere nonummy. Integer non velit.*', '*Punjabi*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'1969663551731'*, '*Programmable regional product*', '*Wordtune*', 1521, '*Quisque porta volutpat erat. Quisque erat eros, viverra eget, congue eget, semper rutrum, nulla. Nunc purus.*', '*Kurdish*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'1187226705882'*, '*Programmable holistic productivity*', '*Flashpoint*', 1900, '*Etiam vel augue. Vestibulum rutrum rutrum neque. Aenean auctor gravida sem.*', '*Finnish*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'9129284454744'*, '*Re-engineered logistical website*', '*Yambee*', 4704, '*In quis justo. Maecenas rhoncus aliquam lacus. Morbi quis tortor id nulla ultrices aliquet.*', '*Sotho*');  
*insert into books (isbn, title, publisher, pages, summary, language) values*  
(*'5741523753966'*, '*Enterprise-wide scalable framework*', '*Kazu*', 4450, '*Cras mi pede, malesuada in, imperdiet et, commodo vulputate, justo. In blandit ultrices enim. Lorem ipsum dolor sit amet, consectetuer adipiscing elit.*', '*Tok Pisin*');

*insert into books (isbn, title, publisher, pages, summary, language) values ('4958732096270', 'Open-architected disintermediate frame', 'Twinte', 1927, 'Proin interdum mauris non ligula pellentesque ultrices. Phasellus id sapien in sapien iaculis congue. Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl.', 'Kashmiri');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('6518563396192', 'Diverse holistic hardware', 'Avabee', 387, 'In hac habitasse platea dictumst. Etiam faucibus cursus urna. Ut tellus.', 'Macedonian');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('0170792598877', 'Ergonomic encompassing benchmark', 'Kazio', 439, 'Vestibulum quam sapien, varius ut, blandit non, interdum in, ante. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Duis faucibus accumsan odio. Curabitur convallis.', 'Malagasy');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('6602753809677', 'Multi-lateral composite task-force', 'Ainyx', 2986, 'Nulla ut erat id mauris vulputate elementum. Nullam varius. Nulla facilisi.', 'Somali');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('4044884221391', 'Streamlined neutral conglomeration', 'Ntag', 3007, 'Phasellus in felis. Donec semper sapien a libero. Nam dui.', 'Yiddish');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('0625623177253', 'Mandatory homogeneous matrices', 'Kwimbee', 1516, 'Curabitur at ipsum ac tellus semper interdum. Mauris ullamcorper purus sit amet nulla. Quisque arcu libero, rutrum ac, lobortis vel, dapibus at, diam.', 'Papiamento');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('7466845973946', 'Cloned transitional groupware', 'Yozio', 2006, 'Suspendisse potenti. In eleifend quam a odio. In hac habitasse platea dictumst.', 'Japanese');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('5125208224630', 'Extended homogeneous website', 'Quatz', 1165, 'Integer ac leo. Pellentesque ultrices mattis odio. Donec vitae nisi.', 'Zulu');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('8562425840137', 'Secured optimizing hierarchy', 'Wordpedia', 1206, 'Donec diam neque, vestibulum eget, vulputate ut, ultrices vel, augue. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollicitudin mi, sit amet lobortis sapien sapien non mi. Integer ac neque.', 'Ndebele');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('9690878171501', 'Ergonomic reciprocal methodology', 'Gigashots', 1556, 'Praesent id massa id nisl venenatis lacinia. Aenean sit amet justo. Morbi ut odio.', 'Papiamento');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('9864251582965', 'Progressive dedicated ability', 'Tazzy', 596, 'Proin interdum mauris non ligula pellentesque ultrices. Phasellus id sapien in sapien iaculis congue. Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl.', 'Bosnian');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('7525461191200', 'Total 24/7 encryption', 'Twimm', 3220, 'Nulla ut erat id mauris vulputate elementum. Nullam varius. Nulla facilisi.', 'Swedish');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('0299456389217', 'Networked user-facing open architecture', 'Linktype', 145, 'Cras mi pede, malesuada in, imperdiet et, commodo vulputate, justo. In blandit ultrices enim. Lorem ipsum dolor sit amet, consectetur adipiscing elit.', 'Romanian');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('4350773692254', 'Realigned asynchronous support', 'Yodel', 4794, 'Proin interdum mauris non ligula pellentesque ultrices. Phasellus id sapien in sapien iaculis congue. Vivamus metus arcu, adipiscing molestie, hendrerit at, vulputate vitae, nisl.', 'Lao');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('3927140461349', 'Progressive zero defect policy', 'Bluezoom', 1061, 'Fusce posuere felis sed lacinus. Morbi sem mauris, laoreet ut, rhoncus aliquet, pulvinar sed, nisl. Nunc rhoncus dui vel sem.', 'Guaraní');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('9989690093308', 'Front-line 24/7 Graphic Interface', 'Trudoo', 487, 'Phasellus sit amet erat. Nulla tempus. Vivamus in felis eu sapien cursus vestibulum.', 'Tamil');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('8647069209643', 'Intuitive foreground intranet', 'Divape', 1997, 'Fusce posuere felis sed lacinus. Morbi sem mauris, laoreet ut, rhoncus aliquet, pulvinar sed, nisl. Nunc rhoncus dui vel sem.', 'Assamese');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('1531312766975', 'Object-based directional open system', 'Topiczoom', 4543, 'Curabitur gravida nisi at nibh. In hac habitasse platea dictumst. Aliquam augue quam, sollicitudin vitae, consectetuer eget, rutrum at, lorem.', 'Fijian');*

*insert into books (isbn, title, publisher, pages, summary, language) values ('6273014587602', 'Digitized client-server process improvement', 'Meezzy', 2298, 'Praesent id massa id nisl venenatis lacinia. Aenean sit amet justo. Morbi ut odio.', 'Kurdish');*

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*insert into books (isbn, title, publisher, pages, summary, language) values ('2239429838032', 'Expanded leading edge analyzer', 'Jabbercube', 1638, 'Suspendisse potenti. In eleifend quam a odio. In hac habitasse platea dictumst.', 'West Frisian');*

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*nisl. Duis ac nibh. Fusce lacus purus, aliquet at, feugiat non, pretium quis, lectus.', 'Tok Pisin');*  
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*tristique, est et tempus semper, est quam pharetra magna, ac consequat metus sapien ut nunc. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Mauris viverra diam vitae quam. Suspendisse potenti. Nullam porttitor lacus at turpis. Donec posuere metus vitae ipsum. Aliquam non mauris. Morbi non lectus. Aliquam sit amet diam in magna bibendum imperdiet. Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis. Fusce posuere felis sed lacus.', 'Tsonga');*  
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quis turpis. Sed ante. Vivamus tortor. Duis mattis egestas metus. Aenean fermentum.
Donec ut mauris eget massa tempor convallis. Nulla neque libero, convallis
eget, eleifend luctus, ultricies eu, nibh. Quisque id justo sit amet sapien dignissim
vestibulum.', 'Northern Sotho');

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sed augue. Aliquam erat volutpat. In congue.', 'Arabic');

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justo.', 'Punjabi');

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Επίσης, γράφουμε αυτό το query προκειμένου να βάλουμε αυτήν την εικόνα για εξώφυλλο κάθε dummy βιβλίου:

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update books set image='https://static-cse.canva.com/blob/921475/PinkandBlack-
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Για τις κατηγορίες (300 entries):

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Για τις λέξεις-κλειδιά (298 entries):

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insert into books_keyword (isbn, keyword) values ('5637151250435', 'lobortis');
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insert into books_keyword (isbn, keyword) values ('6886890911303', 'posuere');
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insert into books_keyword (isbn, keyword) values ('0311999229072', 'id');
insert into books_keyword (isbn, keyword) values ('1880989916727', 'id');
insert into books_keyword (isbn, keyword) values ('0674909573292', 'iaculis');
insert into books_keyword (isbn, keyword) values ('3497871017792', 'integer');
insert into books_keyword (isbn, keyword) values ('4337174964178', 'amet');
insert into books_keyword (isbn, keyword) values ('3233359903008', 'elit');
insert into books_keyword (isbn, keyword) values ('1849562027959', 'in');
insert into books_keyword (isbn, keyword) values ('2605933464940', 'mauris');
insert into books_keyword (isbn, keyword) values ('6665316998471', 'sapien');
insert into books_keyword (isbn, keyword) values ('3434457249094', 'convallis');
insert into books_keyword (isbn, keyword) values ('9401079679717', 'ultrices');
insert into books_keyword (isbn, keyword) values ('6282535018808', 'leo');
insert into books_keyword (isbn, keyword) values ('9512116594361', 'morbi');
insert into books_keyword (isbn, keyword) values ('0307793378720', 'justo');
insert into books_keyword (isbn, keyword) values ('6088775503660', 'vulputate');
insert into books_keyword (isbn, keyword) values ('4825391130222', 'nulla');
insert into books_keyword (isbn, keyword) values ('4531472543465', 'purus');
insert into books_keyword (isbn, keyword) values ('8630212258348', 'id');
insert into books_keyword (isbn, keyword) values ('3054755583226', 'aenean');
insert into books_keyword (isbn, keyword) values ('6424359997295', 'at');
insert into books_keyword (isbn, keyword) values ('6941503348774', 'odio');
insert into books_keyword (isbn, keyword) values ('4157469723312', 'felis');
insert into books_keyword (isbn, keyword) values ('5453558852834', 'in');
insert into books_keyword (isbn, keyword) values ('5674805785564', 'ac');
insert into books_keyword (isbn, keyword) values ('5998893066103', 'in');
insert into books_keyword (isbn, keyword) values ('5624524684158', 'turpis');
insert into books_keyword (isbn, keyword) values ('5340523327623', 'aenean');
insert into books_keyword (isbn, keyword) values ('9271162786673', 'vulputate');
insert into books_keyword (isbn, keyword) values ('6520474320230', 'metus');
insert into books_keyword (isbn, keyword) values ('2041197881464', 'premium');
insert into books_keyword (isbn, keyword) values ('4551192150404', 'quam');
insert into books_keyword (isbn, keyword) values ('2102821942056', 'erat');
insert into books_keyword (isbn, keyword) values ('1887823406832', 'quam');
insert into books_keyword (isbn, keyword) values ('0597909047825', 'non');
insert into books_keyword (isbn, keyword) values ('3646938530520', 'sapien');
insert into books_keyword (isbn, keyword) values ('1089728812164', 'vestibulum');
insert into books_keyword (isbn, keyword) values ('7355800064865', 'amet');
insert into books_keyword (isbn, keyword) values ('4409786147582', 'massa');
insert into books_keyword (isbn, keyword) values ('3697186816645', 'eget');
insert into books_keyword (isbn, keyword) values ('5775360868585', 'consequat');
insert into books_keyword (isbn, keyword) values ('5258929471531', 'lorem');
insert into books_keyword (isbn, keyword) values ('0647432491033', 'ipsum');
insert into books_keyword (isbn, keyword) values ('7615837417331', 'consectetuer');
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insert into books_keyword (isbn, keyword) values ('0277636020622', 'primis');
insert into books_keyword (isbn, keyword) values ('7801913419425', 'nibh');
insert into books_keyword (isbn, keyword) values ('3920489958474', 'nunc');
insert into books_keyword (isbn, keyword) values ('0413566995950', 'ut');
insert into books_keyword (isbn, keyword) values ('4674500211287', 'sagittis');
insert into books_keyword (isbn, keyword) values ('1969663551731', 'nulla');
insert into books_keyword (isbn, keyword) values ('1187226705882', 'ac');
insert into books_keyword (isbn, keyword) values ('9129284454744', 'primis');
insert into books_keyword (isbn, keyword) values ('5741523753966', 'nulla');
insert into books_keyword (isbn, keyword) values ('4958732096270', 'molestie');
insert into books_keyword (isbn, keyword) values ('6518563396192', 'scelerisque');
insert into books_keyword (isbn, keyword) values ('0170792598877', 'consequat');
insert into books_keyword (isbn, keyword) values ('6602753809677', 'ut');
insert into books_keyword (isbn, keyword) values ('4044884221391', 'sapien');
insert into books_keyword (isbn, keyword) values ('0625623177253', 'lobortis');
insert into books_keyword (isbn, keyword) values ('7466845973946', 'posuere');
insert into books_keyword (isbn, keyword) values ('5125208224630', 'erat');
insert into books_keyword (isbn, keyword) values ('8562425840137', 'nulla');
insert into books_keyword (isbn, keyword) values ('9690878171501', ' odio');
insert into books_keyword (isbn, keyword) values ('9864251582965', 'dapibus');
insert into books_keyword (isbn, keyword) values ('7525461191200', 'mauris');
insert into books_keyword (isbn, keyword) values ('0299456389217', 'nonummy');
insert into books_keyword (isbn, keyword) values ('4350773692254', 'non');
insert into books_keyword (isbn, keyword) values ('3927140461349', 'rutm');
insert into books_keyword (isbn, keyword) values ('9989690093308', 'dui');
insert into books_keyword (isbn, keyword) values ('8647069209643', 'quis');
insert into books_keyword (isbn, keyword) values ('1531312766975', 'molestie');
insert into books_keyword (isbn, keyword) values ('6273014587602', 'feugiat');
insert into books_keyword (isbn, keyword) values ('1365767471714', 'nec');
insert into books_keyword (isbn, keyword) values ('9773223347634', 'metus');
insert into books_keyword (isbn, keyword) values ('2946838396846', 'quis');
insert into books_keyword (isbn, keyword) values ('9109476387742', 'potenti');
insert into books_keyword (isbn, keyword) values ('2239429838032', 'amet');
insert into books_keyword (isbn, keyword) values ('8498808515852', 'in');
insert into books_keyword (isbn, keyword) values ('0895604179995', 'volutpat');
insert into books_keyword (isbn, keyword) values ('1377503859248', 'et');
insert into books_keyword (isbn, keyword) values ('3559809039053', 'non');
insert into books_keyword (isbn, keyword) values ('7182435079906', 'natoque');
insert into books_keyword (isbn, keyword) values ('7835367353251', 'libero');
insert into books_keyword (isbn, keyword) values ('9164284517909', 'at');
insert into books_keyword (isbn, keyword) values ('7264167440543', 'aenean');
insert into books_keyword (isbn, keyword) values ('6827739070212', 'turpis');
insert into books_keyword (isbn, keyword) values ('6413864068205', 'tincidunt');
insert into books_keyword (isbn, keyword) values ('5965782931947', 'orci');
insert into books_keyword (isbn, keyword) values ('9675749676736', 'viverra');
insert into books_keyword (isbn, keyword) values ('1513750247136', 'duis');
insert into books_keyword (isbn, keyword) values ('8759116382848', 'turpis');
insert into books_keyword (isbn, keyword) values ('0698870960726', 'libero');
insert into books_keyword (isbn, keyword) values ('5861743523626', 'lorem');
insert into books_keyword (isbn, keyword) values ('0829699543148', 'dictumst');
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insert into books_keyword (isbn, keyword) values ('1038187673218', 'mi');
insert into books_keyword (isbn, keyword) values ('9795278987571', 'semper');
insert into books_keyword (isbn, keyword) values ('8850267946453', 'nulla');
insert into books_keyword (isbn, keyword) values ('9759345048100', 'nulla');
insert into books_keyword (isbn, keyword) values ('6347097825249', 'eget');
insert into books_keyword (isbn, keyword) values ('9387577078018', 'nulla');
insert into books_keyword (isbn, keyword) values ('8664568623869', 'primis');
insert into books_keyword (isbn, keyword) values ('5487578195084', 'amet');
insert into books_keyword (isbn, keyword) values ('1734123385747', 'venenatis');
insert into books_keyword (isbn, keyword) values ('5317456889143', 'non');
insert into books_keyword (isbn, keyword) values ('1559123232579', 'ut');
insert into books_keyword (isbn, keyword) values ('0375989720378', 'at');
insert into books_keyword (isbn, keyword) values ('6045660870888', 'rutrum');
insert into books_keyword (isbn, keyword) values ('1102082303420', 'orci');
insert into books_keyword (isbn, keyword) values ('1465674268159', 'primis');
insert into books_keyword (isbn, keyword) values ('5752558607210', 'pede');
insert into books_keyword (isbn, keyword) values ('0314499954903', 'elementum');
insert into books_keyword (isbn, keyword) values ('6410851116606', 'cursus');
insert into books_keyword (isbn, keyword) values ('2708534695379', 'nulla');
insert into books_keyword (isbn, keyword) values ('1384775782469', 'phasellus');
insert into books_keyword (isbn, keyword) values ('9966242290758', 'dapibus');
insert into books_keyword (isbn, keyword) values ('0809784979155', 'interdum');
insert into books_keyword (isbn, keyword) values ('9401496029041', 'non');
insert into books_keyword (isbn, keyword) values ('3023607894971', 'eros');
insert into books_keyword (isbn, keyword) values ('5637151250435', 'augue');
insert into books_keyword (isbn, keyword) values ('3801803376307', 'aliquet');
insert into books_keyword (isbn, keyword) values ('0311999229072', 'nunc');
insert into books_keyword (isbn, keyword) values ('6886890911303', 'pellentesque');
insert into books_keyword (isbn, keyword) values ('1880989916727', 'et');
insert into books_keyword (isbn, keyword) values ('0674909573292', 'tortor');
insert into books_keyword (isbn, keyword) values ('3497871017792', 'sapien');
insert into books_keyword (isbn, keyword) values ('4337174964178', 'justo');
insert into books_keyword (isbn, keyword) values ('3233359903008', 'quisque');
insert into books_keyword (isbn, keyword) values ('1849562027959', 'est');
insert into books_keyword (isbn, keyword) values ('2605933464940', 'dictumst');
insert into books_keyword (isbn, keyword) values ('6665316998471', 'erat');
insert into books_keyword (isbn, keyword) values ('3434457249094', 'elementum');
insert into books_keyword (isbn, keyword) values ('6282535018808', 'molestie');
insert into books_keyword (isbn, keyword) values ('9512116594361', 'sagittis');
insert into books_keyword (isbn, keyword) values ('0307793378720', 'neque');
insert into books_keyword (isbn, keyword) values ('6088775503660', 'id');
insert into books_keyword (isbn, keyword) values ('4825391130222', 'interdum');
insert into books_keyword (isbn, keyword) values ('4531472543465', 'volutpat');
insert into books_keyword (isbn, keyword) values ('8630212258348', 'lorem');
insert into books_keyword (isbn, keyword) values ('3054755583226', 'sit');
insert into books_keyword (isbn, keyword) values ('6424359997295', 'id');
insert into books_keyword (isbn, keyword) values ('6941503348774', 'duis');
insert into books_keyword (isbn, keyword) values ('4157469723312', 'integer');
insert into books_keyword (isbn, keyword) values ('5453558852834', 'neque');
insert into books_keyword (isbn, keyword) values ('5674805785564', 'lacinia');
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insert into books_keyword (isbn, keyword) values ('5998893066103', 'habitasse');
insert into books_keyword (isbn, keyword) values ('5624524684158', 'potenti');
insert into books_keyword (isbn, keyword) values ('5340523327623', 'viverra');
insert into books_keyword (isbn, keyword) values ('9271162786673', 'sapien');
insert into books_keyword (isbn, keyword) values ('6520474320230', 'lorem');
insert into books_keyword (isbn, keyword) values ('2041197881464', 'sed');
insert into books_keyword (isbn, keyword) values ('4551192150404', 'premium');
insert into books_keyword (isbn, keyword) values ('2102821942056', 'tristique');
insert into books_keyword (isbn, keyword) values ('1887823406832', 'risus');
insert into books_keyword (isbn, keyword) values ('0597909047825', 'et');
insert into books_keyword (isbn, keyword) values ('3646938530520', 'praesent');
insert into books_keyword (isbn, keyword) values ('1089728812164', 'posuere');
insert into books_keyword (isbn, keyword) values ('7355800064865', 'in');
insert into books_keyword (isbn, keyword) values ('4409786147582', 'at');
insert into books_keyword (isbn, keyword) values ('3697186816645', 'praesent');
insert into books_keyword (isbn, keyword) values ('5775360868585', 'eu');
insert into books_keyword (isbn, keyword) values ('5258929471531', 'lacinia');
insert into books_keyword (isbn, keyword) values ('0647432491033', 'etiam');
insert into books_keyword (isbn, keyword) values ('7615837417331', 'ac');
insert into books_keyword (isbn, keyword) values ('0277636020622', 'aenean');
insert into books_keyword (isbn, keyword) values ('7801913419425', 'vivamus');
insert into books_keyword (isbn, keyword) values ('3920489958474', 'porta');
insert into books_keyword (isbn, keyword) values ('0413566995950', 'natoque');
insert into books_keyword (isbn, keyword) values ('4674500211287', 'et');
insert into books_keyword (isbn, keyword) values ('1969663551731', 'libero');
insert into books_keyword (isbn, keyword) values ('1187226705882', 'aliquam');
insert into books_keyword (isbn, keyword) values ('9129284454744', 'tristique');

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Για τους συγγραφείς (278 entries):

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insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('2708534695379', 'Lydie', 'Hedvige', 'Mournian');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('1384775782469', 'Aleen', 'Mabelle', 'Arkow');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('9966242290758', 'Francine', 'Winona', 'Atherton');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('2708534695379', 'Carmine', 'Riva', 'Jorioz');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('9401496029041', 'Davidson', 'Eddi', 'Shervil');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3023607894971', 'Kacey', 'Amye', 'Acott');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5637151250435', 'Corette', 'Bernie', 'Kermath');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('2708534695379', 'Pennie', 'Jelene', 'Dombrell');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('9966242290758', 'Pierre', 'Drucy', 'Kenwin');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6886890911303', 'Jennifer', 'Gladys', 'Thurlow');

```

```
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('9966242290758', 'Clotilda', 'Calla', 'Rathborne');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('0674909573292', 'Tully', 'Salaidh', 'Foxwell');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3497871017792', 'Giles', 'Carlin', 'MacKniely');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('4337174964178', 'Byrann', 'Allyce', 'Blint');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3233359903008', 'Jeffy', 'Rivalee', 'Jelkes');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('1849562027959', 'Ajay', 'Jacinta', 'Steutly');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('2605933464940', 'Pennie', 'Jelene', 'Dombrell');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6665316998471', 'Stephi', 'Emlyn', 'Mensler');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3434457249094', 'Jewelle', 'Audy', 'Clackers');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('9401079679717', 'Jewelle', 'Audy', 'Clackers');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6282535018808', 'Pennie', 'Jelene', 'Dombrell');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('9512116594361', 'Pennie', 'Jelene', 'Dombrell');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('0307793378720', 'Jewelle', 'Audy', 'Clackers');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6088775503660', 'Kellia', 'Eleonore', 'Muckeen');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('4825391130222', 'Pete', 'Alaine', 'Dobbings');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('4531472543465', 'Garald', 'Marna', 'Camble');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('8630212258348', 'Abner', 'Mignonne', 'Castledine');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3054755583226', 'Felix', 'Morissa', 'Kluss');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6424359997295', 'Freddy', 'Cammi', 'Byre');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6941503348774', 'Eustacia', 'Kary', 'Alvey');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('4157469723312', 'Beck', 'Alexandra', 'Eastgate');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5453558852834', 'Joyce', 'Cal', 'Woodson');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5674805785564', 'Averil', 'Hildy', 'Provis');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5998893066103', 'Fleur', 'Gabbey', 'Baudinelli');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5624524684158', 'Irwin', 'Belva', 'Sickamore');
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insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5340523327623', 'Walt', 'Maddy', 'Tembridge');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('9271162786673', 'Zaccaria', 'Gaynor', 'Roma');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6520474320230', 'Ddene', 'Grace', 'Greenslade');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('2041197881464', 'Francoise', 'Fayina', 'Sandeman');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('4551192150404', 'Trudie', 'Cynthea', 'Cleere');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('2102821942056', 'Alick', 'Bidget', 'Carnall');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('1887823406832', 'Silvia', 'Nomi', 'Noad');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('0597909047825', 'Toiboid', 'Nadya', 'Hardisty');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3646938530520', 'Stavro', 'Ruth', 'Loghan');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('1089728812164', 'Igor', 'Denys', 'Ockland');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('7355800064865', 'Wallie', 'Kassi', 'Tessyman');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('4409786147582', 'Ashby', 'Marrissa', 'Mees');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3697186816645', 'Buddy', 'Benetta', 'Tesche');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5775360868585', 'Morton', 'Maxi', 'Purdom');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5258929471531', 'Hillery', 'Yettie', 'Whatson');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('0647432491033', 'Paco', 'Jolyn', 'Barents');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('7615837417331', 'Camella', 'Dale', 'Cadore');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('0277636020622', 'Zebadiah', 'Carolee', 'Bodocs');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('7801913419425', 'Ronni', 'Kerrie', 'Baltrushaitis');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3920489958474', 'Conn', 'Florry', 'Hayselden');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('0413566995950', 'Bobbie', 'Annemarie', 'Hamon');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('4674500211287', 'Wilmar', 'Korella', 'Girdler');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('1969663551731', 'Jemmy', 'Selinda', 'Selland');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('1187226705882', 'Drusie', 'Belicia', 'Gringley');
insert into books_author (isbn, author_first_name, author_middle_name, au-
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insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5741523753966', 'Erina', 'Vivienne', 'Rothon');
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thor_last_name) values ('4958732096270', 'Gerta', 'Adore', 'Howship');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6518563396192', 'Lennard', 'Shelly', 'Castanaga');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('0170792598877', 'Patricia', 'Nanci', 'Kingcott');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6602753809677', 'Suzi', 'Carri', 'Radloff');
insert into books_author (isbn, author_first_name, author_middle_name, au-
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insert into books_author (isbn, author_first_name, author_middle_name, au-  
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insert into books_author (isbn, author_first_name, author_middle_name, au-  
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insert into books_author (isbn, author_first_name, author_middle_name, au-  
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insert into books_author (isbn, author_first_name, author_middle_name, au-  
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insert into books_author (isbn, author_first_name, author_middle_name, au-  
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insert into books_author (isbn, author_first_name, author_middle_name, au-  
thor_last_name) values ('0698870960726', 'Lonee', 'Trudy', 'Gare');  
insert into books_author (isbn, author_first_name, author_middle_name, au-  
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insert into books_author (isbn, author_first_name, author_middle_name, au-  
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insert into books_author (isbn, author_first_name, author_middle_name, au-  
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thor_last_name) values ('9387577078018', 'Alyssa', 'Lyndsey', 'Andrin');  
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insert into books_author (isbn, author_first_name, author_middle_name, au-  
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insert into books_author (isbn, author_first_name, author_middle_name, au-  
thor_last_name) values ('1559123232579', 'Peterus', 'Hedy', 'Meco');  
insert into books_author (isbn, author_first_name, author_middle_name, au-  
thor_last_name) values ('0375989720378', 'Ritchie', 'Meridel', 'Niece');  
insert into books_author (isbn, author_first_name, author_middle_name, au-  
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insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5752558607210', 'Hastie', 'Latrina', 'Spiller');
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thor_last_name) values ('0314499954903', 'Opaline', 'Cathee', 'Clarke-Williams');
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thor_last_name) values ('6410851116606', 'Gearard', 'Catina', 'Mushawe');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('2708534695379', 'Lisbeth', 'Francene', 'Shill');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('1384775782469', 'Eva', 'Abagael', 'Garfoot');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('9966242290758', 'Currey', 'Berta', 'Extil');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('0809784979155', 'Odetta', 'Nadya', 'Kubecka');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('9401496029041', 'Cordy', 'Daune', 'Southernwood');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3023607894971', 'Shandie', 'Liv', 'Born');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5637151250435', 'Florinda', 'Myrah', 'Francillo');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3801803376307', 'Adrianne', 'Lilian', 'Gothliff');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('0311999229072', 'Revkah', 'Doris', 'Fielding');
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thor_last_name) values ('6886890911303', 'Perl', 'Danice', 'Spendley');
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thor_last_name) values ('1880989916727', 'Nancy', 'Dana', 'Kitcat');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('0674909573292', 'Ddene', 'Louise', 'Demageard');
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thor_last_name) values ('3497871017792', 'Wrennie', 'Romy', 'Crowne');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('4337174964178', 'Candy', 'Hyacinth', 'Veck');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3233359903008', 'Ruprecht', 'Amalie', 'Selvester');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('1849562027959', 'Concettina', 'Sandy', 'Marchington');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('2605933464940', 'Ryun', 'Grethel', 'Cockill');
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thor_last_name) values ('6665316998471', 'Marven', 'Desiree', 'Eastabrook');
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thor_last_name) values ('3434457249094', 'Ryley', 'Miran', 'Luckham');
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thor_last_name) values ('6282535018808', 'Clarice', 'Carlene', 'Beastall');
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thor_last_name) values ('9512116594361', 'Wandie', 'Maighdiln', 'Charette');
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thor_last_name) values ('0307793378720', 'Cobby', 'Nanete', 'Dumberell');
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thor_last_name) values ('6088775503660', 'Abdel', 'Maia', 'Aitkin');
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thor_last_name) values ('4825391130222', 'Culver', 'Tedi', 'Ead');
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thor_last_name) values ('4531472543465', 'Marcelia', 'Selestina', 'Wisker');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('8630212258348', 'Tristan', 'Jennilee', 'Olenichev');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('3054755583226', 'Rosene', 'Alleen', 'Frere');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6424359997295', 'Carline', 'Adela', 'Kleen');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('6941503348774', 'Melodie', 'Julianne', 'Podmore');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('4157469723312', 'Ramonda', 'Marjory', 'Milner');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5453558852834', 'Stefa', 'Thomasine', 'Argrave');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5674805785564', 'Lindsay', 'Susette', 'Cortez');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5998893066103', 'Worth', 'Meta', 'Sheals');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5624524684158', 'Flossie', 'Muriel', 'Ratledge');
insert into books_author (isbn, author_first_name, author_middle_name, au-
thor_last_name) values ('5340523327623', 'Hartwell', 'Rhiamon', 'Kimber');
insert into books_author (isbn, author_first_name, author_middle_name, au-
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Για τα αντίτυπα (219 entries):

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insert into copies (copy_id, isbn, school_id) values (721, '1734123385747',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (587, '5317456889143',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (872, '1559123232579',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (265, '0375989720378',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (739, '6045660870888',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (838, '1102082303420',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (706, '1465674268159',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (265, '5752558607210',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (790, '0314499954903',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (971, '6410851116606',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (768, '2708534695379',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (659, '1384775782469',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (294, '9966242290758',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (222, '0809784979155',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (998, '9401496029041',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (494, '3023607894971',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (562, '5637151250435',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (427, '3801803376307',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (662, '0311999229072',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (478, '6886890911303',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (757, '1880989916727',  
'cg4o9lmy');
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insert into copies (copy_id, isbn, school_id) values (726, '0674909573292',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (918, '3497871017792',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (451, '4337174964178',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (199, '3233359903008',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (771, '1849562027959',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (633, '2605933464940',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (458, '6665316998471',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (664, '3434457249094',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (963, '9401079679717',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (194, '6282535018808',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (362, '9512116594361',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (604, '0307793378720',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (460, '6088775503660',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (283, '4825391130222',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (360, '4531472543465',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (444, '8630212258348',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (664, '3054755583226',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (444, '6424359997295',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (499, '6941503348774',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (252, '4157469723312',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (248, '5453558852834',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (717, '5674805785564',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (950, '5998893066103',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (768, '5624524684158',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (720, '5340523327623',  
'cg4o9lmy');
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insert into copies (copy_id, isbn, school_id) values (438, '9271162786673',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (820, '6520474320230',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (483, '2041197881464',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (632, '4551192150404',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (452, '2102821942056',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (480, '1887823406832',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (748, '0597909047825',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (178, '3646938530520',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (434, '1089728812164',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (962, '7355800064865',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (657, '4409786147582',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (731, '3697186816645',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (480, '5775360868585',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (823, '5258929471531',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (542, '0647432491033',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (614, '7615837417331',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (162, '0277636020622',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (487, '7801913419425',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (230, '3920489958474',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (519, '0413566995950',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (488, '4674500211287',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (786, '1969663551731',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (107, '1187226705882',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (158, '9129284454744',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (892, '5741523753966',  
'cg4o9lmy');
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insert into copies (copy_id, isbn, school_id) values (268, '4958732096270',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (416, '6518563396192',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (217, '0170792598877',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (686, '6602753809677',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (769, '4044884221391',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (278, '0625623177253',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (916, '7466845973946',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (180, '5125208224630',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (744, '8562425840137',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (344, '9690878171501',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (457, '9864251582965',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (695, '7525461191200',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (582, '0299456389217',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (650, '4350773692254',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (787, '3927140461349',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (126, '9989690093308',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (347, '8647069209643',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (669, '1531312766975',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (325, '6273014587602',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (111, '1365767471714',  
'cg4o9lmy');  
insert into copies (copy_id, isbn, school_id) values (617, '9773223347634',  
'0p8ju3vq');  
insert into copies (copy_id, isbn, school_id) values (961, '2946838396846',  
'cbnx7ywj');  
insert into copies (copy_id, isbn, school_id) values (810, '9109476387742',  
'l0xrbdy6');  
insert into copies (copy_id, isbn, school_id) values (832, '2239429838032',  
'6e3w27za');  
insert into copies (copy_id, isbn, school_id) values (679, '8498808515852',  
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insert into copies (copy_id, isbn, school_id) values (830, '0895604179995',
'0p8ju3vq');
insert into copies (copy_id, isbn, school_id) values (823, '1377503859248',
'cbnx7ywj');
insert into copies (copy_id, isbn, school_id) values (927, '3559809039053',
'10xrbdy6');
insert into copies (copy_id, isbn, school_id) values (448, '7182435079906',
'6e3w27za');
insert into copies (copy_id, isbn, school_id) values (545, '7835367353251',
'cg4o9lmy');
insert into copies (copy_id, isbn, school_id) values (447, '9164284517909',
'0p8ju3vq');
insert into copies (copy_id, isbn, school_id) values (880, '7264167440543',
'cbnx7ywj');
insert into copies (copy_id, isbn, school_id) values (838, '6827739070212',
'10xrbdy6');
insert into copies (copy_id, isbn, school_id) values (432, '6413864068205',
'6e3w27za');
insert into copies (copy_id, isbn, school_id) values (885, '5965782931947',
'cg4o9lmy');
insert into copies (copy_id, isbn, school_id) values (853, '9675749676736',
'0p8ju3vq');
insert into copies (copy_id, isbn, school_id) values (686, '1513750247136',
'cbnx7ywj');
insert into copies (copy_id, isbn, school_id) values (465, '8759116382848',
'10xrbdy6');
insert into copies (copy_id, isbn, school_id) values (422, '0698870960726',
'6e3w27za');

```

Για τον διαχειριστή της βάσης δεδομένων (1 entry):

```

insert into admins(username, password, first_name, last_name) values ('sreppas',
'12345678', 'Stratos', 'Reppas');

```

Για τους χειριστές των βιβλιοθηκών (5 entries):

```

insert into lib_ops (username, approved_by_admin) values ('jessica_p', 'sreppas');
insert into lib_ops (username, approved_by_admin) values ('johndoe', 'sreppas');
insert into lib_ops (username, approved_by_admin) values ('just_in', 'sreppas');
insert into lib_ops (username, approved_by_admin) values ('kelly', 'sreppas');
insert into lib_ops (username, approved_by_admin) values ('kattie', 'sreppas');

```

Για τις αξιολογήσεις (48 entries):

```

insert into reviews (isbn, username, comment, rating, date) values
('2708534695379', 'donkeykong', 'Sed sagittis. Nam congue, risus semper porta
volutpat, quam pede lobortis ligula, sit amet eleifend pede libero quis orci. Nullam
molestie nibh in lectus.', 2, '2022-5-11');

```

```
insert into reviews (isbn, username, comment, rating, date) values
('1384775782469', 'jessicca', 'Etiam vel augue. Vestibulum rutrum rutrum neque. Aenean auctor gravida sem.', 5, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('9966242290758', 'kati', 'Integer tincidunt ante vel ipsum. Praesent blandit lacinia erat. Vestibulum sed magna at nunc commodo placerat.', 5, '2022-5-15');
insert into reviews (isbn, username, comment, rating, date) values
('0809784979155', 'laura', 'Cras non velit nec nisi vulputate nonummy. Maecenas tincidunt lacus at velit. Vivamus vel nulla eget eros elementum pellentesque.', 5, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('9401496029041', 'lissa', 'Integer tincidunt ante vel ipsum. Praesent blandit lacinia erat. Vestibulum sed magna at nunc commodo placerat.', 5, '2022-5-11');
insert into reviews (isbn, username, comment, rating, date) values
('3023607894971', 'natalie', 'Fusce consequat. Nulla nisl. Nunc nisl.', 3, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('5637151250435', 'oliver', 'Aenean lectus. Pellentesque eget nunc. Donec quis orci eget orci vehicula condimentum.', 1, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('3801803376307', 'paul', 'Integer tincidunt ante vel ipsum. Praesent blandit lacinia erat. Vestibulum sed magna at nunc commodo placerat.', 2, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('0311999229072', 'rebecca', 'Quisque id justo sit amet sapien dignissim vestibulum. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Nulla dapibus dolor vel est. Donec odio justo, sollicitudin ut, suscipit a, feugiat et, eros.', 2, '2022-5-11');
insert into reviews (isbn, username, comment, rating, date) values
('6886890911303', 'robert', 'Duis aliquam convallis nunc. Proin at turpis a pede posuere nonummy. Integer non velit.', 4, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('1880989916727', 'ryan', 'Duis consequat dui nec nisi volutpat eleifend. Donec ut dolor. Morbi vel lectus in quam fringilla rhoncus.', 4, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('0674909573292', 'janedoe', 'Integer tincidunt ante vel ipsum. Praesent blandit lacinia erat. Vestibulum sed magna at nunc commodo placerat.', 4, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('3497871017792', 'janedore', 'In sagittis dui vel nisl. Duis ac nibh. Fusce lacus purus, aliquet at, feugiat non, pretium quis, lectus.', 4, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('4337174964178', 'jasson', 'In sagittis dui vel nisl. Duis ac nibh. Fusce lacus purus, aliquet at, feugiat non, pretium quis, lectus.', 3, '2022-5-11');
insert into reviews (isbn, username, comment, rating, date) values
('3233359903008', 'kattie', 'In congue. Etiam justo. Etiam pretium iaculis justo.', 2, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('1849562027959', 'kevin', 'In hac habitasse platea dictumst. Morbi vestibulum, velit id pretium iaculis, diam erat fermentum justo, nec condimentum neque sapien placerat ante. Nulla justo.', 1, '2022-5-12');
```

```
insert into reviews (isbn, username, comment, rating, date) values
('2605933464940', 'kimber', 'Nullam sit amet turpis elementum ligula vehicula conse-
quat. Morbi a ipsum. Integer a nibh.', 2, '2022-5-13');
insert into reviews (isbn, username, comment, rating, date) values
('6665316998471', 'larry', 'Proin eu mi. Nulla ac enim. In tempor, turpis nec euismod
scelerisque, quam turpis adipiscing lorem, vitae mattis nibh ligula nec sem.', 5,
'2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('3434457249094', 'luke', 'In quis justo. Maecenas rhoncus aliquam lacus. Morbi quis
tortor id nulla ultrices aliquet.', 4, '2022-5-13');
insert into reviews (isbn, username, comment, rating, date) values
('9401079679717', 'michael', 'Pellentesque at nulla. Suspendisse potenti. Cras in
purus eu magna vulputate luctus.', 3, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('6282535018808', 'nathan', 'Nullam porttitor lacus at turpis. Donec posuere metus
vitae ipsum. Aliquam non mauris.', 2, '2022-5-11');
insert into reviews (isbn, username, comment, rating, date) values
('9512116594361', 'nicko', 'In congue. Etiam justo. Etiam pretium iaculis justo.', 3,
'2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('0307793378720', 'oscar69', 'Duis bibendum. Morbi non quam nec dui luctus rutrum.
Nulla tellus.', 1, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('6088775503660', 'jason', 'In sagittis dui vel nisl. Duis ac nibh. Fusce lacus purus,
aliquet at, feugiat non, pretium quis, lectus.', 4, '2022-5-13');
insert into reviews (isbn, username, comment, rating, date) values
('4825391130222', 'just_in', 'Cum sociis natoque penatibus et magnis dis parturient
montes, nascetur ridiculus mus. Vivamus vestibulum sagittis sapien. Cum sociis
natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.', 3,
'2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('4531472543465', 'kelly', 'Phasellus sit amet erat. Nulla tempus. Vivamus in felis eu
sapien cursus vestibulum.', 1, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('8630212258348', 'lance', 'Mauris enim leo, rhoncus sed, vestibulum sit amet, cur-
sus id, turpis. Integer aliquet, massa id lobortis convallis, tortor risus dapibus augue,
vel accumsan tellus nisi eu orci. Mauris lacinia sapien quis libero.', 4, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('3054755583226', 'linda', 'Morbi porttitor lorem id ligula. Suspendisse ornare conse-
quat lectus. In est risus, auctor sed, tristique in, tempus sit amet, sem.', 3, '2022-5-
11');
insert into reviews (isbn, username, comment, rating, date) values
('6424359997295', 'lisasa', 'Donec diam neque, vestibulum eget, vulputate ut, ultrices
vel, augue. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere
cubilia Curae; Donec pharetra, magna vestibulum aliquet ultrices, erat tortor sollici-
tudin mi, sit amet lobortis sapien sapien non mi. Integer ac neque.', 4, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('6941503348774', 'logan', 'Proin eu mi. Nulla ac enim. In tempor, turpis nec euismod
scelerisque, quam turpis adipiscing lorem, vitae mattis nibh ligula nec sem.', 3,
'2022-5-13');
```

```
insert into reviews (isbn, username, comment, rating, date) values
('4157469723312', 'migel', 'Proin leo odio, porttitor id, consequat in, consequat ut,
nulla. Sed accumsan felis. Ut at dolor quis odio consequat varius.', 4, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('5453558852834', 'natallie', 'Nullam sit amet turpis elementum ligula vehicula conse-
quat. Morbi a ipsum. Integer a nibh.', 5, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('5674805785564', 'oscar', 'Pellentesque at nulla. Suspendisse potenti. Cras in purus
eu magna vulputate luctus.', 2, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('5998893066103', 'paige', 'Morbi non lectus. Aliquam sit amet diam in magna biben-
dum imperdiet. Nullam orci pede, venenatis non, sodales sed, tincidunt eu, felis.', 1,
'2022-5-13');
insert into reviews (isbn, username, comment, rating, date) values
('5624524684158', 'rebecca', 'Proin leo odio, porttitor id, consequat in, consequat ut,
nulla. Sed accumsan felis. Ut at dolor quis odio consequat varius.', 4, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('5340523327623', 'roberto', 'Cras mi pede, malesuada in, imperdiet et, commodo
vulputate, justo. In blandit ultrices enim. Lorem ipsum dolor sit amet, consectetuer
adipiscing elit.', 4, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('9271162786673', 'jessica_p', 'Maecenas tristique, est et tempus semper, est quam
pharetra magna, ac consequat metus sapien ut nunc. Vestibulum ante ipsum primis
in faucibus orci luctus et ultrices posuere cubilia Curae; Mauris viverra diam vitae
quam. Suspendisse potenti.', 1, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('6520474320230', 'jimy', 'Curabitur in libero ut massa volutpat convallis. Morbi odio
odio, elementum eu, interdum eu, tincidunt in, leo. Maecenas pulvinar lobortis est.',
5, '2022-5-15');
insert into reviews (isbn, username, comment, rating, date) values
('2041197881464', 'johndore', 'Curabitur in libero ut massa volutpat convallis. Morbi
odio odio, elementum eu, interdum eu, tincidunt in, leo. Maecenas pulvinar lobortis
est.', 1, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('4551192150404', 'kimberly', 'Morbi non lectus. Aliquam sit amet diam in magna
bibendum imperdiet. Nullam orci pede, venenatis non, sodales sed, tincidunt eu, fe-
lis.', 1, '2022-5-15');
insert into reviews (isbn, username, comment, rating, date) values
('2102821942056', 'leah', 'Lorem ipsum dolor sit amet, consectetuer adipiscing elit.
Proin risus. Praesent lectus.', 3, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('1887823406832', 'liza', 'Praesent blandit. Nam nulla. Integer pede justo, lacinia
eget, tincidunt eget, tempus vel, pede.', 1, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('0597909047825', 'lucas', 'Cras non velit nec nisi vulputate nonummy. Maecenas tin-
cidunt lacus at velit. Vivamus vel nulla eget eros elementum pellentesque.', 3, '2022-
5-15');
insert into reviews (isbn, username, comment, rating, date) values
('3646938530520', 'matthew', 'Nullam porttitor lacus at turpis. Donec posuere metus
vitae ipsum. Aliquam non mauris.', 3, '2022-5-12');
```

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insert into reviews (isbn, username, comment, rating, date) values
('1089728812164', 'melissa', 'In congue. Etiam justo. Etiam pretium iaculis justo.', 1,
'2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('7355800064865', 'nick', 'In sagittis dui vel nisl. Duis ac nibh. Fusce lacus purus, ali-
quet at, feugiat non, pretium quis, lectus.', 3, '2022-5-12');
insert into reviews (isbn, username, comment, rating, date) values
('4409786147582', 'olivia', 'Sed ante. Vivamus tortor. Duis mattis egestas metus.', 4,
'2022-5-15');
insert into reviews (isbn, username, comment, rating, date) values
('3697186816645', 'patrick', 'Duis bibendum, felis sed interdum venenatis, turpis
enim blandit mi, in porttitor pede justo eu massa. Donec dapibus. Duis at velit eu est
congue elementum.', 3, '2022-5-12');

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Για τους δανεισμούς (50 entries):

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insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('liza', 127, 'cg4o9lmy', '2023-04-25', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('laura', 807, '0p8ju3vq', '2023-05-16', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('jason', 314, 'cbnx7ywj', '2023-05-18', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, return_date, ap-
proved_by_op) values ('jackson', 138, 'l0xrbdy6', '2023-04-29', null, 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('michael', 389, '6e3w27za', '2023-04-27', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('paulaner', 363, 'cg4o9lmy', '2023-04-24', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, return_date, ap-
proved_by_op) values ('robert', 650, '0p8ju3vq', '2023-04-29', null, 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('paige', 305, 'cbnx7ywj', '2023-04-28', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('nathan_drake', 723, 'l0xrbdy6', '2023-04-26', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('luke', 552, '6e3w27za', '2023-04-29', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('melissa', 984, 'cg4o9lmy', '2023-04-24', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('natalie', 746, '0p8ju3vq', '2023-04-23', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('natalie', 518, 'cbnx7ywj', '2023-04-27', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('laurel', 595, 'l0xrbdy6', '2023-04-24', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('kevin', 554, '6e3w27za', '2023-04-28', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) val-
ues ('kimberly', 887, 'cg4o9lmy', '2023-04-27', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, return_date, ap-
proved_by_op) values ('kati', 694, '0p8ju3vq', '2023-04-29', '2023-04-30', 'kelly');

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insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('kelly', 177, 'cbnx7ywj', '2023-04-24', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('jenny', 240, 'l0xrbdy6', '2023-04-24', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('jimy', 254, 'cg4o9lmy', '2023-04-24', null, 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('donkeykong', 663, '0p8ju3vq', '2023-04-23', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('jason', 767, 'cbnx7ywj', '2023-04-25', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('johndoe', 140, 'l0xrbdy6', '2023-05-15', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('nathan', 646, '6e3w27za', '2023-04-25', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('liza', 993, 'cg4o9lmy', '2023-04-25', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('paul', 255, '0p8ju3vq', '2023-04-28', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('karla', 321, 'cbnx7ywj', '2023-04-25', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('janedore', 839, 'l0xrbdy6', '2023-04-29', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('natalie', 501, '6e3w27za', '2023-04-24', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('rachell', 713, 'cg4o9lmy', '2023-04-28', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('celly', 242, '0p8ju3vq', '2023-04-29', '2023-04-30', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('kimberly', 105, 'cbnx7ywj', '2023-04-26', '2023-04-30', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('kelly', 219, 'l0xrbdy6', '2023-04-25', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('jessica_p', 518, '6e3w27za', '2023-04-28', '2023-04-30', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('megan', 806, 'cg4o9lmy', '2023-04-23', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('kimber', 224, '0p8ju3vq', '2023-04-24', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('jason', 939, 'cbnx7ywj', '2023-04-24', '2023-04-30', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('jason', 494, 'l0xrbdy6', '2023-04-27', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('jimy', 456, '6e3w27za', '2023-04-28', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('karla', 356, 'cg4o9lmy', '2023-04-27', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('laura', 289, '0p8ju3vq', '2023-04-26', 'kelly');

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insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('paulaner', 925, 'cbnx7ywj', '2023-04-25', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('migel', 553, 'l0xrbdy6', '2023-04-24', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('melissa', 684, '6e3w27za', '2023-04-28', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('paige', 990, 'cg4o9lmy', '2023-04-23', null, 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('donkeykong', 401, '0p8ju3vq', '2023-04-24', null, 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('mark', 283, 'cbnx7ywj', '2023-04-28', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('nicko', 473, 'l0xrbdy6', '2023-04-26', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('jenny', 292, '6e3w27za', '2023-04-24', '2023-04-30', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('rachel', 216, 'cg4o9lmy', '2023-04-24', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('rebecca', 212, '0p8ju3vq', '2023-04-28', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('migel', 609, 'cbnx7ywj', '2023-04-25', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('mark', 331, 'l0xrbdy6', '2023-04-23', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('nicko', 302, '6e3w27za', '2023-04-27', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('patrick', 528, 'cg4o9lmy', '2023-04-27', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('oliver', 409, '0p8ju3vq', '2023-04-28', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('lance', 749, 'cbnx7ywj', '2023-04-23', '2023-04-30', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('karla', 273, 'l0xrbdy6', '2023-04-27', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('janedore', 853, '6e3w27za', '2023-04-24', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('jessica_p', 531, 'cg4o9lmy', '2023-04-27', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('matthew', 174, '0p8ju3vq', '2023-04-24', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('nathan_drake', 573, 'cbnx7ywj', '2023-04-26', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('celly', 592, 'l0xrbdy6', '2023-04-27', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('jasson', 568, '6e3w27za', '2023-04-29', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('oscar69', 534, 'cg4o9lmy', '2023-04-23', null, 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('michael', 466, '0p8ju3vq', '2023-04-23', 'kelly');

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insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('rachel', 591, 'cbnx7ywj', '2023-04-25', null, 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('user123', 511, 'l0xrbdy6', '2023-04-28', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('paige', 393, '6e3w27za', '2023-04-23', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('lisasa', 891, 'cg4o9lmy', '2023-04-23', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('johndore', 194, '0p8ju3vq', '2023-04-27', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('rachel', 145, 'cbnx7ywj', '2023-04-26', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('lissa', 578, 'l0xrbdy6', '2023-04-27', null, 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('kevin', 968, '6e3w27za', '2023-04-27', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('jenny', 799, 'cg4o9lmy', '2023-04-29', 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('ryan', 400, '0p8ju3vq', '2023-04-25', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('lance', 192, 'cbnx7ywj', '2023-04-29', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('rachell', 168, 'l0xrbdy6', '2023-04-24', null, 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('rachel', 304, '6e3w27za', '2023-04-25', '2023-04-30', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('rachell', 755, 'cg4o9lmy', '2023-04-29', null, 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('ryan', 271, '0p8ju3vq', '2023-04-26', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('janedoe', 594, 'cbnx7ywj', '2023-04-25', '2023-04-30', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('jackson', 872, 'l0xrbdy6', '2023-04-27', '2023-04-30', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('jackson', 708, '6e3w27za', '2023-04-25', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('paulaner', 232, 'cg4o9lmy', '2023-04-23', null, 'jessica_p');
insert into rentals (username, copy_id, school_id, rental_date, return_date, approved_by_op) values ('jason', 108, '0p8ju3vq', '2023-04-25', '2023-04-30', 'kelly');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('lisasa', 102, 'cbnx7ywj', '2023-04-26', 'just_in');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('celly', 343, 'l0xrbdy6', '2023-04-24', 'johndoe');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('larry', 816, '6e3w27za', '2023-04-29', 'kattie');
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('kimberly', 618, 'cg4o9lmy', '2023-04-29', 'jessica_p');

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insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('user123', 111, 'cg4o9lmy', '2023-04-24', 'jessica_p');  
insert into rentals (username, copy_id, school_id, rental_date, approved_by_op) values ('user123', 769, 'cg4o9lmy', '2023-04-24', 'jessica_p');
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Τέλος για τις κρατήσεις (43 entries)

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insert into reservations (username, copy_id, school_id, reservation_date) values ('roberto', 400, '0p8ju3vq', '2023-04-24');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('paige', 192, 'cbnx7ywj', '2023-04-27');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('celly', 168, 'l0xrbdy6', '2023-04-23');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('user123', 304, '6e3w27za', '2023-04-27');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('jimy', 755, 'cg4o9lmy', '2023-04-29');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('kattie', 271, '0p8ju3vq', '2023-04-24');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('lance', 594, 'cbnx7ywj', '2023-04-24');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('celly', 872, 'l0xrbdy6', '2023-04-26');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('natallie', 708, '6e3w27za', '2023-04-25');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('liza', 232, 'cg4o9lmy', '2023-04-23');  
insert into reservations (username, copy_id, school_id) values ('linda', 494, 'cg4o9lmy');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('larry', 108, '0p8ju3vq', '2023-04-28');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('jason', 102, 'cbnx7ywj', '2023-04-27');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('megan', 343, 'l0xrbdy6', '2023-04-28');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('oliver', 816, '6e3w27za', '2023-04-25');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('leah', 618, 'cg4o9lmy', '2023-04-28');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('kelly', 281, '0p8ju3vq', '2023-04-26');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('jason', 567, 'cbnx7ywj', '2023-04-26');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('megan', 899, 'l0xrbdy6', '2023-04-23');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('kimber', 382, '6e3w27za', '2023-04-28');  
insert into reservations (username, copy_id, school_id, reservation_date) values ('olivia', 960, 'cg4o9lmy', '2023-04-26');
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insert into reservations (username, copy_id, school_id, reservation_date) values ('kattie', 160, '0p8ju3vq', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date) values ('just_in', 747, 'cbnx7ywj', '2023-04-25');
insert into reservations (username, copy_id, school_id, reservation_date) values ('laurel', 570, 'l0xrbdy6', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date) values ('kattie', 562, '6e3w27za', '2023-04-26');
insert into reservations (username, copy_id, school_id, reservation_date) values ('olivia', 785, 'cg4o9lmy', '2023-04-29');
insert into reservations (username, copy_id, school_id, reservation_date) values ('luke', 339, '0p8ju3vq', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date) values ('lance', 652, 'cbnx7ywj', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date) values ('rachel', 941, 'l0xrbdy6', '2023-04-25');
insert into reservations (username, copy_id, school_id, reservation_date) values ('olivia', 880, '6e3w27za', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date) values ('patrick', 187, 'cg4o9lmy', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date) values ('jimy', 320, '0p8ju3vq', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date) values ('lance', 542, 'cbnx7ywj', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date) values ('rachell', 933, 'l0xrbdy6', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date) values ('leah', 125, '6e3w27za', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date, cancellation_date) values ('user123', 721, 'cg4o9lmy', '2023-04-26', '2023-04-30');
insert into reservations (username, copy_id, school_id, reservation_date) values ('paulaner', 587, '0p8ju3vq', '2023-04-28');
insert into reservations (username, copy_id, school_id, reservation_date, cancellation_date) values ('logan', 872, 'cbnx7ywj', '2023-04-29', null);
insert into reservations (username, copy_id, school_id, reservation_date, cancellation_date) values ('rachell', 265, 'l0xrbdy6', '2023-04-26', '2023-04-30');
insert into reservations (username, copy_id, school_id, reservation_date) values ('jenny', 739, '6e3w27za', '2023-04-25');
insert into reservations (username, copy_id, school_id, reservation_date) values ('user123', 838, 'cg4o9lmy', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date) values ('olivia', 706, '0p8ju3vq', '2023-04-29');
insert into reservations (username, copy_id, school_id, reservation_date) values ('logan', 265, 'cbnx7ywj', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date) values ('rachel', 790, 'l0xrbdy6', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date) values ('lucas', 971, '6e3w27za', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date) values ('nick', 768, 'cg4o9lmy', '2023-04-29');
```

```
insert into reservations (username, copy_id, school_id, reservation_date) values ('jenny', 659, '0p8ju3vq', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date) values ('lisasa', 294, 'cbnx7ywj', '2023-04-28');
insert into reservations (username, copy_id, school_id, reservation_date) values ('jasson', 222, 'l0xrbdy6', '2023-04-29');
insert into reservations (username, copy_id, school_id, reservation_date) values ('laurel', 998, '6e3w27za', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date, cancellation_date) values ('johndore', 494, 'cg4o9lmy', '2023-04-25', '2023-04-30');
insert into reservations (username, copy_id, school_id, reservation_date) values ('luke', 562, '0p8ju3vq', '2023-04-29');
insert into reservations (username, copy_id, school_id, reservation_date) values ('oscar', 427, 'cbnx7ywj', '2023-04-26');
insert into reservations (username, copy_id, school_id, reservation_date, cancellation_date) values ('laurel', 662, 'l0xrbdy6', '2023-04-27', '2023-04-30');
insert into reservations (username, copy_id, school_id, reservation_date) values ('oliver', 478, '6e3w27za', '2023-04-29');
insert into reservations (username, copy_id, school_id, reservation_date) values ('melissa', 757, 'cg4o9lmy', '2023-04-29');
insert into reservations (username, copy_id, school_id, reservation_date) values ('jessica_p', 726, '0p8ju3vq', '2023-04-28');
insert into reservations (username, copy_id, school_id, reservation_date) values ('oscar', 918, 'cbnx7ywj', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date) values ('ryan', 451, 'l0xrbdy6', '2023-04-25');
insert into reservations (username, copy_id, school_id, reservation_date) values ('lissa', 199, '6e3w27za', '2023-04-25');
insert into reservations (username, copy_id, school_id, reservation_date) values ('melissa', 771, 'cg4o9lmy', '2023-04-26');
insert into reservations (username, copy_id, school_id, reservation_date) values ('johndore', 633, '0p8ju3vq', '2023-04-27');
insert into reservations (username, copy_id, school_id, reservation_date) values ('migel', 458, 'cbnx7ywj', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date) values ('patrick', 664, 'l0xrbdy6', '2023-04-25');
insert into reservations (username, copy_id, school_id, reservation_date, cancellation_date) values ('megan', 963, '6e3w27za', '2023-04-27', '2023-04-30');
insert into reservations (username, copy_id, school_id, reservation_date) values ('lucas', 194, 'cg4o9lmy', '2023-04-27');
insert into reservations (username, copy_id, school_id, reservation_date) values ('jasson', 362, '0p8ju3vq', '2023-04-25');
insert into reservations (username, copy_id, school_id, reservation_date) values ('migel', 604, 'cbnx7ywj', '2023-04-26');
insert into reservations (username, copy_id, school_id, reservation_date) values ('patrick', 460, 'l0xrbdy6', '2023-04-23');
insert into reservations (username, copy_id, school_id, reservation_date) values ('jackson', 283, '6e3w27za', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date) values ('luucas', 360, 'cg4o9lmy', '2023-04-27');
```

```

insert into reservations (username, copy_id, school_id, reservation_date) values
('linda', 444, '0p8ju3vq', '2023-04-26');
insert into reservations (username, copy_id, school_id, reservation_date, cancellation_date) values ('roberto', 664, 'cbnx7ywj', '2023-04-27', '2023-04-30');
insert into reservations (username, copy_id, school_id, reservation_date, cancellation_date) values ('natallie', 444, 'l0xrbdy6', '2023-04-29', '2023-04-30');
insert into reservations (username, copy_id, school_id, reservation_date) values ('nathan_drake', 499, '6e3w27za', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date) values ('peter', 252, 'cg4o9lmy', '2023-04-25');
insert into reservations (username, copy_id, school_id, reservation_date) values ('leah', 248, '0p8ju3vq', '2023-04-28');
insert into reservations (username, copy_id, school_id, reservation_date) values ('roberto', 717, 'cbnx7ywj', '2023-04-24');
insert into reservations (username, copy_id, school_id, reservation_date) values ('paul', 950, 'l0xrbdy6', '2023-04-25');
insert into reservations (username, copy_id, school_id, reservation_date) values ('jessicca', 768, '6e3w27za', '2023-04-26');

```

Αξίζει να σημειωθεί, ότι πολλά από τα παραπάνω τα queries αφήνονται σκοπίμως λανθασμένα προς επίδειξη λειτουργίας των triggers που υλοποιήσαμε προηγουμένως.

## Views – Queries

Ως εδώ έχουμε συνθέσει όλα τα structures τα οποία αφορούν το database schema (tables), έχουμε γεμίσει με dummy data τους πίνακες, αλλά και έχουμε υλοποιήσει τους διάφορους αυτοματισμούς με τους διαχειριζόμαστε τα εν λόγω data (triggers και events). Από δω και έπειτα θα ασχοληθούμε με τους διάφορους τρόπους με τους οποίους οι διάφοροι χρήστες του συστήματός μας θα μπορούν να προσπελαύνουν αυτά τα δεδομένα.

Στον σχεδιασμό και την ανάπτυξη βάσεων δεδομένων, πολλές φορές βρισκόμαστε σε σημείο που επαναλαμβάνουμε πολλαπλές φορές σχετικά περίπλοκα queries ή που επιθυμούμε να αποκρύψουμε ορισμένες ευαίσθητες πληροφορίες. Σ' αυτές τις περιπτώσεις, ο ορισμός ενός view μπορεί να αποδειχθεί εξαιρετικά βοηθητικός. Παρακάτω παρουσιάζονται όλα τα views τα οποία έχουμε δημιουργήσει στην δική μας βάση:

```

Create view counts_approves (username, first_name, last_name, count) as
select lo.username, u.first_name, u.last_name, count(l.approved_by_op) from user u
join lib_ops lo on u.username = lo.username left join rentals l on l.approved_by_op =
lo.username where timestampdiff(year, l.rental_date, curdate())<1 group by
u.first_name, u.last_name having count(l.approved_by_op)>20;

```

Το παραπάνω view δημιουργεί έναν εικονικό πίνακα ο οποίος περιέχει το username, το ονοματεπώνυμο, καθώς και το συνολικό αριθμό εγκρίσεων ανά library operator για το τρέχων έτος και για τους οποίους ισχύει ότι έχουν εγκρίνει άνω των 20 κρατήσεων έκαστος.

Κάνοντας χρήση του παραπάνω view, μπορούμε, πλέον, εύκολα, να δημιουργήσουμε ένα άλλο view, το coincidence, το οποίο θα επιστρέφει από την λίστα του counts\_approves τα username και τους αριθμούς εγκρίσεων εκείνων των οποίων το πλήθος των εγκρίσεων τυχαίνει να είναι ίσο. Η παρουσίαση γίνεται σε φθίνουσα σειρά:

```
create view coincidence (username, count) as
select ca1.username, ca1.count from counts_approves ca1 join counts_approves
ca2 on ca1.username <> ca2.username and ca1.count = ca2.count group by
ca1.username order by ca1.count desc;
```

Το εν λόγω view είναι η απάντηση στο ερώτημα 3.1.5.

Επόμενο view είναι το category\_pair. Το συγκεκριμένο view μας παρέχει έναν εικονικό πίνακα με τα 3 πιο δημοφιλή ζεύγη κατηγοριών βιβλίων παρουσιασμένων κατά φθίνουσα σειρά. Κριτήριο δημοφιλίας κρίνεται το πλήθος των βιβλίων (που ανήκουν σε αυτή τη δυάδα κατηγοριών) που έχουν τεθεί υπό δανεισμό:

```
Create view category_pairs
(category1, category2, rental_count)
as
select category1, category2, rental_count from (select bc1.category as category1,
bc2.category as category2, count(*) as rental_count from books_category bc1 join
books_category bc2 on bc1.isbn = bc2.isbn join copies c on c.isbn = bc1.isbn or
c.isbn = bc2.isbn join rentals l on l.copy_id = c.copy_id and l.school_id = c.school_id
where bc1.category < bc2.category group by bc1.category, bc2.category order by
rental_count desc limit 3) as subquery;
```

Το εν λόγω view είναι η απάντηση στο ερώτημα 3.1.6.

Ακολουθεί ένα view το οποίο επιστρέφει τα ονόματα όλων εκείνων των συγγραφέων οι οποίοι έχουν γράψει, συνολικά, τουλάχιστον 5 βιβλία λιγότερα από το συγγραφέα των περισσότερων βιβλίων στην βάση. Για κάθε επιστρεφόμενο συγγραφέα, εκτυπώνεται, επιπροσθέτως, και ο αριθμός των βιβλίων που έχει γράψει.

```
Create view authors_less_than_5
(first_name, middle_name, last_name, number_of_books)
As
select author_first_name, author_middle_name, author_last_name, count(isbn) from
books_author group by author_first_name, author_middle_name, author_last_name
having count(isbn) <= (select max(book_count) as max_count from (select
count(isbn) as book_count from books_author group by author_first_name, au-
thor_middle_name, author_last_name) as counts)-5;
```

Το εν λόγω view είναι η απάντηση στο ερώτημα 3.1.7.

Το, δε, παρακάτω code snippet, πρόκειται για τον ορισμό ενός view που επιστρέφει τα username και τα ονοματεπώνυμα εκείνων των χρηστών οι οποίοι έχουν καθυστερήσει κάποιας επιστροφής και έχουν λάβει ποινή για αυτό:

```
Create view bad_rentals
(username, first_name, last_name, school_id, rental_id, rental_date, days_delayed)
as
```

```

select u.username, u.first_name, u.last_name, u.school_id, r.rental_id,
min(r.rental_date), timestampdiff(day, min(deadline_date), curdate()) as days_delayed
from user u join rentals r on u.username = r.username where u.penalty=true
and r.return_date is null group by username
order by days_delayed asc;

```

Μαζί με τα παραπάνω, το bad\_rentals επιστρέφει την σχολική μονάδα στην οποία ανήκει ο εκάστοτε χρήστης, καθώς και το rental\_id του πιο αργοπορημένου δανεισμού, την ημερομηνία καταγραφής του εν λόγω δανεισμού και τις συνολικές μέρες που η επιστροφή θεωρείται εκπρόθεσμη. Το εν λόγω view είναι η απάντηση στο ερώτημα 3.2.2.

Τα δύο views που ακολουθούν επιστρέφουν τον μέσο όρο αξιολογήσεων κάθε χρήστη και κάθε για κάθε κατηγορία, αντίστοιχα και είναι η λύση του ερωτήματος 3.2.3.

```

create view avg_rating_user
(username, average_rating)
as
Select username, avg(rating) as average_rating from reviews group by username
order by average_rating desc;

create view avg_rating_category
(category, average_rating)
as
Select c.category, avg(r.rating) as average_rating from reviews r join books_category c on c.isbn = r.isbn group by c.category order by average_rating desc;

```

Το young\_users επιστρέφει username, ονοματεπώνυμο και πλήθος κρατήσεων όλων των καθηγητών κάτω των σαράντα ετών, ταξινομημένων κατά φθίνοντα αριθμό κρατήσεων:

```

Create view young_users
(username, first_name, last_name, age, total_rentals)
as
Select p.username, u.first_name, u.last_name, u.age, count(r.rental_id) as total_rentals
from professors p join user u on u.username=p.username left join rentals r on
r.username = u.username where u.age<40 group by p.username, u.age order by total_rentals desc;

```

Το εν λόγω view είναι η απάντηση του ερωτήματος του 3.1.3

Ακολουθεί το view που δημιουργεί εικονικό πίνακα με τα ονόματα όλων εκείνων των συγγραφέων των οποίων κανένα βιβλίο δεν έχει τύχει δανεισμού.

```

Create view lame_authors
(first_name, middle_name, last_name, total_rentals)
as
select ba.author_first_name, ba.author_middle_name, ba.author_last_name,
count(r.rental_id) as rental_counter from books_author ba join copies c on ba.isbn =
c.isbn left join rentals r on c.copy_id = r.copy_id and r.school_id= c.school_id group
by ba.author_first_name, ba.author_middle_name, ba.author_last_name having
rental_counter = 0;

```

Το εν λόγω view είναι η απάντηση του ερωτήματος του 3.1.4

Επιπλέον, δημιουργήσαμε τα δύο κάτωθι views τα οποία, καθώς υποδηλώνει και το όνομα αποτελούν τις λύσεις του ερωτήματος 3.1.2:

*Create view 312a*

```
(author_first_name, author_middle_name, author_last_name, category)  
as
```

```
Select a.author_first_name, a.author_middle_name, a.author_last_name, c.category  
From books_author a join books_category c on a.isbn=c.isbn;
```

*Create view 312b*

```
(username, first_name, last_name, category)  
as
```

```
Select p.username, u.first_name, u.last_name, c.category  
From professors p join rentals r on r.username=p.username join copies cop on  
cop.copy_id=r.copy_id and cop.school_id = r.school_id join books_category c on  
cop.isbn=c.isbn join user u on u.username=p.username  
Where year(r.rental_date)=year(curdate());
```

Το 312a, δημιουργεί έναν εικονικό πίνακα που περιέχει όλους τους συγγραφείς και τις κατηγορίες τι οποίες έχουν γράψει.

Το, δε, 312b, δημιουργεί έναν εικονικό πίνακα που περιέχει όλες τις κατηγορίες βιβλίων που έχουν τεθεί υπό δανεισμό από καθηγητές, ανά καθηγητή.

Τέλος, ορίζουμε το book\_availability το οποίο υπολογίζει το σύνολο των διαθέσιμων αντιτύπων όλων των βιβλίων για το σύνολο του δικτύου σχολικών βιβλιοθηκών:

```
create view book_availability (isbn, school_id, availability) as  
select b.isbn, school_id, count(c.available) as availability  
from books b  
Left join copies c on c.isbn = b.isbn and c.available = true group by b.isbn;  
Select * from book_availability;
```

Και το lib\_op\_approval\_rentals που επιστρέφει το username, ονοματεπώνυμο και όνομα σχολείου κάθε χειριστή βιβλιοθήκης εγγεγραμμένου στην βάση, καθώς και το username του διαχειριστή που τους ενέκρινε.

Τα εναπομείναντα queries που μας ζητούνται στο μέρος 3 της εξαμηνιαίας άσκησης υλοποιούνται όχι με views, αλλά ως σκέτα queries. Έτσι, λοιπόν, έχουμε:

```
select r.username, b.title, r.copy_id, r.school_id, r.rental_date, r.deadline_date, r.return_date from books b join copies c on b.isbn=c.isbn join rentals r on  
c.copy_id=r.copy_id and c.school_id=r.school_id where r.username='%'{}%'';
```

Για το 3.3.2

```
select b.isbn, b.title, group_concat(distinct concat(c1.category, ', ', c2.category) separator ', ') as categories, group_concat(distinct concat (a.author_first_name, ', ', a.author_last_name) separator ', ') as authors, round(avg(rev.rating), 2) as rating from
```

```
books b left join books_author a on b.isbn = a.isbn join books_category c1 on c1.isbn = b.isbn left join books_category c2 on c2.isbn = b.isbn and c2.category <> c1.category left join copies cop on cop.isbn = b.isbn left join reviews rev on rev.isbn = b.isbn where b.title like '%{}%' or author_first_name like '{}%' or author_last_name like '{}%' or c1.category LIKE '{}%' group by b.isbn, b.title;
```

Για το 3.3.1

```
select b.isbn, b.title, GROUP_CONCAT(distinct c.category SEPARATOR ', ') as categories, GROUP_CONCAT(distinct k.keyword SEPARATOR ', ') as keywords, GROUP_CONCAT(distinct CONCAT(a.author_first_name, ' ', a.author_last_name) SEPARATOR ', ') AS authors, availability, b.summary, b.pages, b.publisher, b.image, b.language from books b join book_availability ba on ba.isbn=b.isbn join books_author a on b.isbn=a.isbn join books_category c on c.isbn=b.isbn left join copies cop on cop.isbn=b.isbn join books_keyword k on k.isbn=b.isbn where cop.available=True and ( b.title like '%{}%' or author_first_name like '{}%' or author_last_name like '{}%' or category like '{}%' or keyword like '{}%' or availability like '{}%') GROUP BY b.isbn, b.title;
```

Για το 3.2.1. και τα

```
Select su.school_id, su.school_name, count(r.rental_id) as total_rentals from rentals r right join school_units su on su.school_id=r.school_id group by su.school_id order by total_rentals desc;
```

```
Select su.school_id, su.school_name, count(r.rental_id) as total_rentals from rentals r right join school_units su on su.school_id=r.school_id where month(rental_id)=month(%s) and year(rental_id)=year(%s) group by su.school_id order by total_rentals desc;
```

Για το 3.1.1.

Ο λόγος για τον οποίο τα παραπάνω queries δεν γίνονται και αυτά views είναι γιατί περιέχουν μεταβλητές συνθήκες που εξαρτώνται από τον εκάστοτε χρήστη ή κάποια είσοδο. Για τον λόγο αυτά υλοποιούνται σε γλώσσα python στα πλαίσια της σχεδίασης της ιστοσελίδας και αντιγραφή τους στο terminal θα οδηγούσε σε συντακτικό σφάλμα.

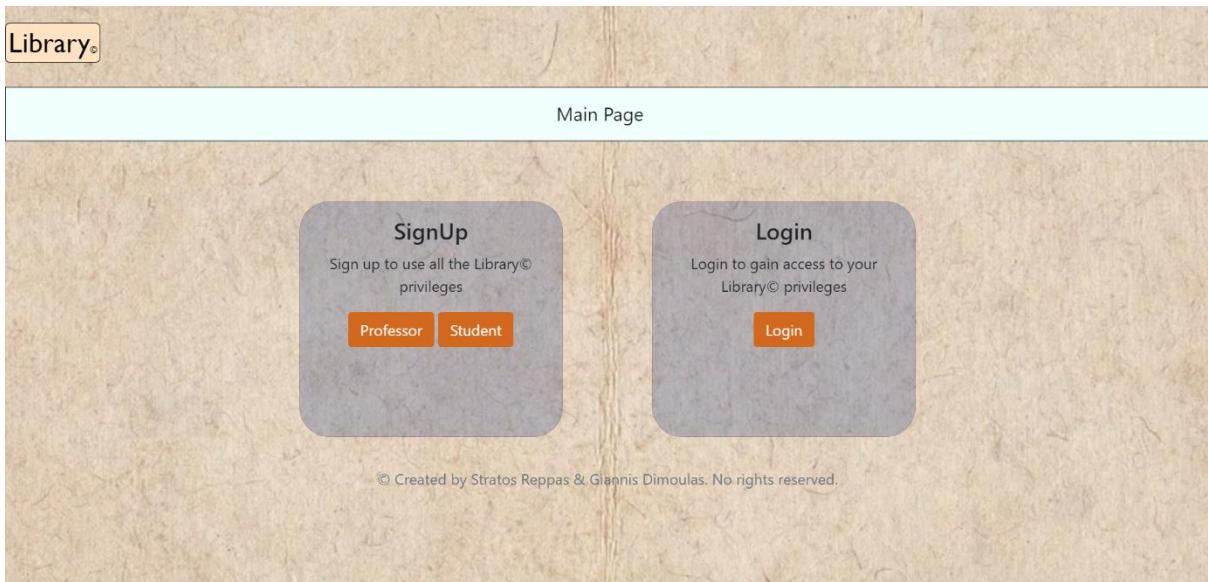
# USER MANUAL ®

---

Welcome to Library®, a site that links libraries from schools all over the nation!

The first page a user encounters is the main page, where someone can login or sign up. At any time, pressing the logo will redirect you back to this page.

There are two ways for a user to sign up: As a professor or as a student



In the student signup form, the student is required to give a username (this will be his main identifier in the website), a password, his first and last name, an email, a phone, his school name, a street name, a street number and his birthdate. He can also add his class number and grade, as well as the tier he is in (primary school, junior highschool, highschool)

**Student SignUp**

\*Username  
Enter Username

\*Password  
Enter Password

\*First name  
Enter first name

\*Last name  
Enter Last Name

\*Email  
Enter Email

\*Phone  
Enter Phone

\*School Name  
Katz

\*Address (Street Name)  
Enter street name

\*Address (Street Number)  
Enter street number

\*Birthdate  
mm/dd/yyyy

Class (Class Number)  
Enter Class Number

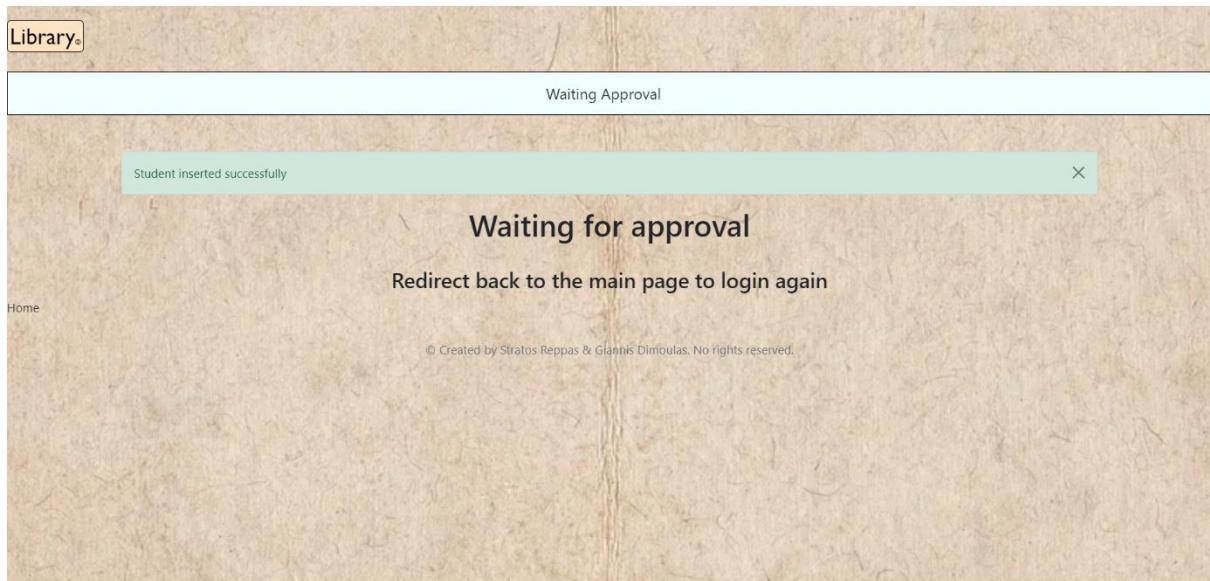
Class (Class Grade)  
Enter Class Grade

Class (Class Tier)  
primary school

**Sign Up**

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Then the student is redirected to another page, that informs them that the signup was successful and that they are pending validation. He can then return to the home page via a link in the page.

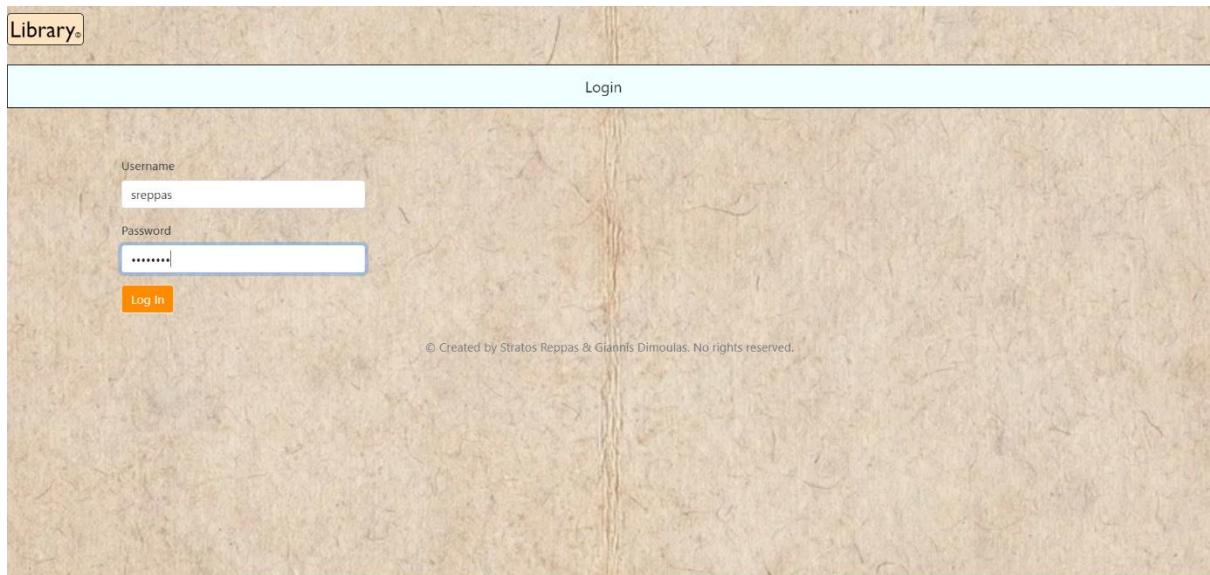


The professor signup form is quite similar. The primary differentiations are the specialty box instead of class info, where he can input the class that they teach, and also a special tick box that expresses his will of becoming a library operator. Any professor can apply for operator, but the administrator selects the ones that can have this responsibility, one per school. After submitting the form, the professor is redirected to the same page as the student.

The form fields include:  
\*Email: Enter Email  
\*Phone: Enter Phone  
\*School Name: Katz (dropdown menu)  
\*Address (Street Name): Enter street name  
\*Address (Street Number): Enter street number  
\*Birthdate: mm/dd/yyyy  
Specialty: Enter Specialty  
 Apply for lib\_op  
**Sign Up**

At the bottom, a footer note reads: "© Created by Stratos Reppas & Giannis Dimoulas. No rights reserved."

Back to the main page, we can now try to login. If in the meantime the operator of our school accepted us in the system, we can login to our user main page, providing we input the correct username and password. This form can identify what role each user of the system has (user, admin, operator) and redirects him in the correct page.



## User page

When a user is accepted into the system, they can view login to his user main page. Here, they can see the Library® offers them: They can see their past reviews, rentals and reservations, view and interact with the book catalog in their school and view their data.



In the MyRentals® page, one can list their past rentals and their status. If the return date is None but the deadline date is past due, the user has a penalty, meaning they can't reserve or rent anything, as long as the copy remains in their possession. In this page, no other action is made possible, since every action of the rentals (making and return) is the responsibility of the local operator.

The screenshot shows a web application interface with a header "Library" and a main content area titled "MyRentals®". Below the title is a table listing past reservations:

Rental ID	Book Name	#Copy	Rental Date	Deadline	Return Date
47	Cloned object-oriented encryption	343	2023-04-24	2023-05-01	None
37	Ergonomic encompassing benchmark	592	2023-04-27	2023-05-04	None

At the bottom of the content area, there is a copyright notice: "© Created by Stratos Reppas & Giannis Dimoulas. No rights reserved."

In the MyReservations® page, one can list their past reservations and their status. Reservations are canceled automatically every week. Aside from that, one can also cancel pending reservations. By that, you revoke your reservation by setting automatically the cancellation date and then the copy that you had reserved is available again

The screenshot shows a web application interface with a header "Library" and a main content area titled "MyReservations®". Below the title is a table listing past reservations:

Reservation ID	Book Name	#Copy	Reservation Date	Deadline	Cancellation Date
3	Managed maximized matrices	494	2023-06-04	2023-06-11	None

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In the MyReviews® page, one can view his past reviews and their status. When a review is approved, meaning it is now publicly available, the Approved column gets the username of the operator that approved it. A user can also delete any of his past reviews, even if it is approved or not.

The screenshot shows a "Reviews Page" titled "MyReviews®". A table displays a single review entry:

Review ID	Book	Rating	Comment	Date	Approved
25	Compatible tangible strategy	3	Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Vivamus vestibulum sagittis sapien. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.	2022-05-12	None

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In the MyData® page, one can view his data on the page. Professors can also edit any of their data, except for username which will result in error, and the students have no such rights. Any user can however change their password, by pressing the corresponding button. They are then redirected to a form page to make the change and then redirected back to MyData® page.

The screenshot shows a "MyData®" page. A table displays a user profile:

Username	Password	First Name	Last Name	School Name	Email	Phone	Street Name	Last Name	E
celly	RdnbkQf	Nissie	Laker	Kwiliith	nlakerd@cnbc.com	1181229052	Messerschmidt	43	

A "Change Password" button is located at the bottom left. A copyright notice at the bottom reads: © Created by Stratos Reppas & Giannis Dimoulas. No rights reserved.

Library

Change Password

### Change your Password

New Password  
.....

Update

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When a professor edits their data, they are redirected back to the signup form, where they can see all their data stored. They have to make sure that they do not alter the username, since an error message will be invoked, and also to select all the fields they want to update or not. School name is not stored there so they have to reselect it and they also cannot apply for operator any more. After submission, they are redirected back to the MyData® page, where they can see that their changes were made successfully.

Library

MyData®

Phone	Street	Last Name	Can Rent	Can Reserve	Penalty	Approved_by_op	Specialty			
1556666046	Eagan	6	1926-11-01	96	1	1	0	None	history	

Change Password

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Library

Professor Edit

\*Username  
just\_in

\*Password  
Enter Password

\*First name  
Jilleen

\*Last name  
Daveran

\*Email  
jdaveran18@xinhuanet.com

\*Phone  
1556666046

\*School Name

Perhaps the most important page of all, the Browse Library® gives you access to the list of the books available for rental in your school. Here you can view all of these books and also search through them using the search bar (search in Title, Author Name (first and last separately), Category and Keyword). Books are listed in a unique floating style but they are also in a list at the bottom of the page. By pressing on a book, you can view all of their information, as well as view their reviews (redirected to a different page). You also have the ability to write a review for this (also redirected to a different page) or make a reservation for this book. The system automatically selects an available copy and reserves it for you. If no copies are available, the reservation cannot be completed. After a reservation, you are redirected to the MyReservations® page.

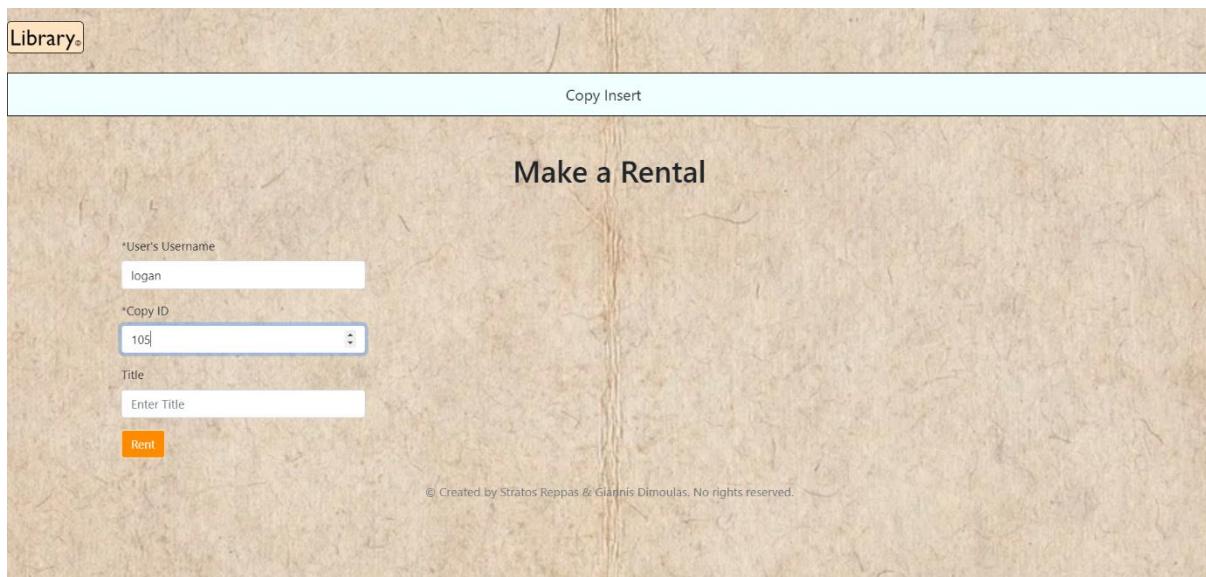


## Library Operator

The operator main page has given the operator all the tools he needs for the task.



The operator can make a rental in the Make a Rental page. By filling up the username and the copy\_id, he can add a rental. An error message appears in case of any constraints being violated. The operator can also insert the book title (optional). The main idea is that a user will go to the operator's desk, give them the book with the copy id inside, tell them their username and they are good to go, with their favorite book on their hands!



Library

Rental Completed successfully

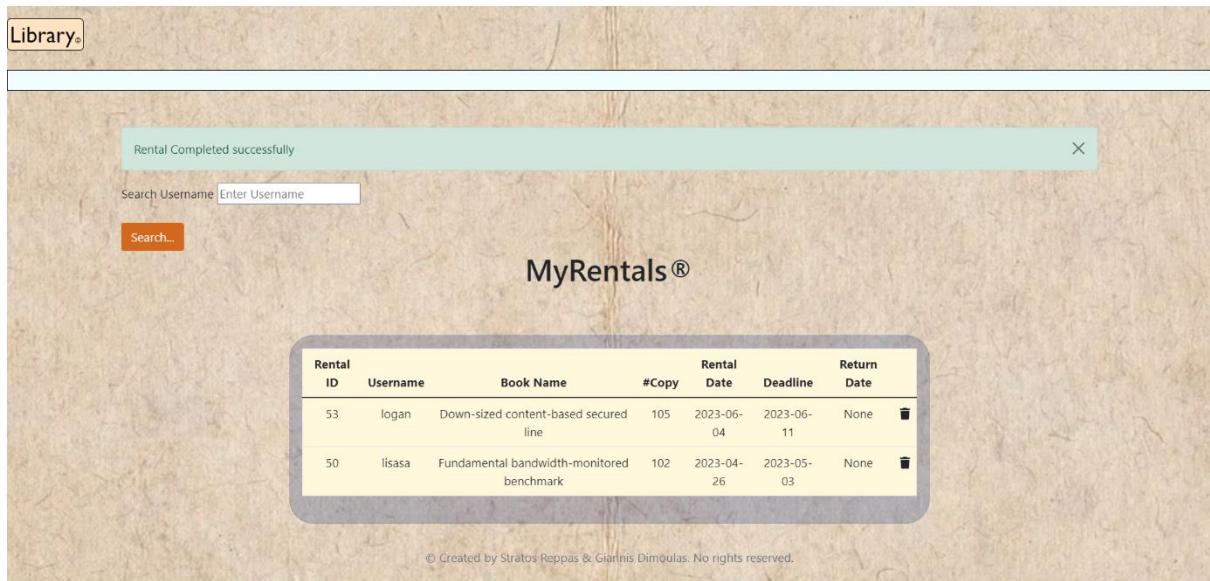
Search Username

Search...

**MyRentals®**

Rental ID	Username	Book Name	#Copy	Rental Date	Deadline	Return Date
53	logan	Down-sized content-based secured line	105	2023-06-04	2023-06-11	None 
50	lisasa	Fundamental bandwidth-monitored benchmark	102	2023-04-26	2023-05-03	None 

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In case a user has made a reservation, they are instructed to give them its reservation id. Then the operator can fill in the id in the Fulfill a Reservation page and everything else is handled by the system.

Library

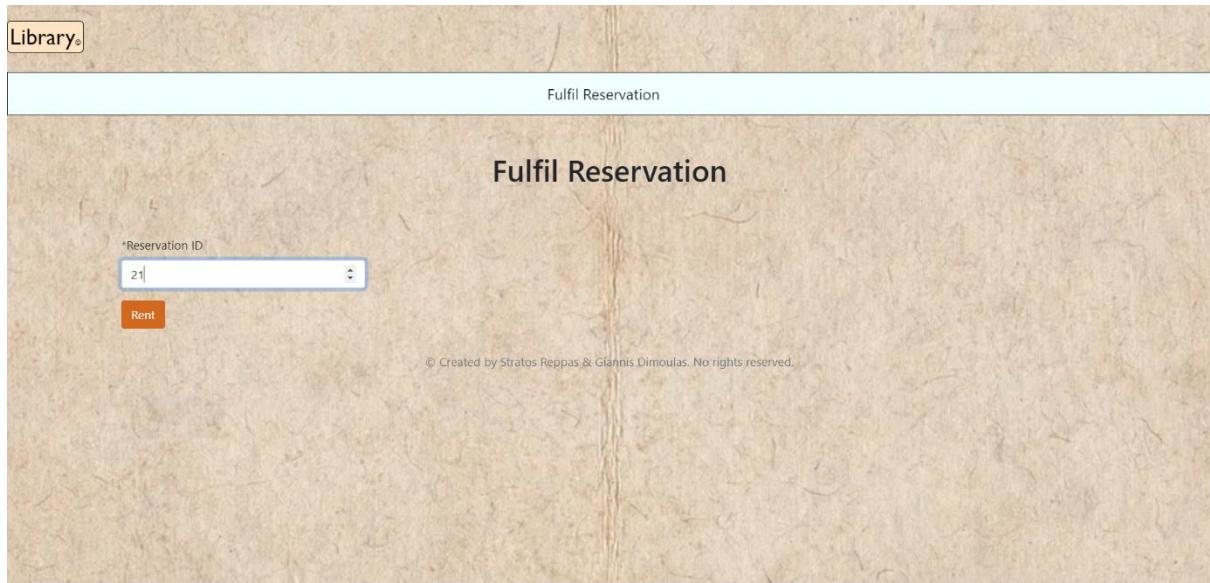
Fulfil Reservation

**Fulfil Reservation**

\*Reservation ID

Rent

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The operator can also return a book by filling the rental id in the Return a Rental page. Simple as that!

Library

Make Rental

### Make a Rental

\*Rental ID

[Return](#)

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Library

Return Completed successfully

### MyRentals®

Search Username

[Search...](#)

Rental ID	Username	Book Name	#Copy	Rental Date	Deadline	Return Date
53	logan	Down-sized content-based secured line	105	2023-06-04	2023-06-11	2023-06-04
50	lisasa	Fundamental bandwidth-monitored benchmark	102	2023-04-26	2023-05-03	None
42	lance	Intuitive foreground intranet	192	2023-04-29	2023-05-06	None
33	lance	Programmable regional product	749	2023-04-23	2023-04-30	2023-04-30

The operator is also responsible for approving the users of their school. They can do that in the Approve a User page, where he can see listed all the professors and students waiting for approval. After they approve a user, the operator username appears in the Approved column. Meanwhile, “a card with the user’s data is printed”. They can also disapprove any user or even delete them (providing they have made no actions in the library. If it is necessary to delete an active user, which is really not recommended for consistency purposes, the operator has to first delete every rental, reservation and review the user has made, otherwise an error will appear).

**Professors**

Street Name	Street Number	Birthdate	Age	Specialty	Can Rent	Can Reserve	Penalty	Approved_by_op
Eagan	6	1926-11-01	96	history	1	1	0	None ✓ ✕ 🗑️
Ballisman	44	2011-05-21	12	physics	0	1	1	None ✓ ✕ 🗑️

**Students**

Username	Password	First Name	Last Name	Email	Phone	Street Name
jason	KBU0Gp8Bih	Mauricio	Latter	mlatter1w@cnn.com	8062839684	Harper

The same is true for the Approve a Review table. Here, though, the deletion can be done directly, since reviews aren't seen as a vital part of Library®'s function.

Review 36 approved successfully

**Review**

ID	Username	Book Title	Rating	Comment	Date	Approved
36		Optional tertiary installation	4	Cras mi pede, malesuada in, imperdiet et, commodo vulputate, justo. In blandit ultrices enim. Lorem ipsum dolor sit amet, consectetur adipiscing elit.	2022-05-12	just_in ✓ ✕ 🗑️
35		Mandatory multi-state function	4	Proin leo odio, porttitor id, consequat in, consequat ut, nulla. Sed accumsan felis. Ut at dolor quis odio consequat varius.	2022-05-12	None ✓ ✕ 🗑️
34		Progressive static function	1	Morbi non lectus. Aliquam sit amet diam in magna bibendum imperdiet. Nullam ornare pede, venenatis non, sodales sed, tincidunt eu.	2022-05-13	None ✓ ✕ 🗑️

An operator can also add a book to the database. By going in the Insert a Book page, they are redirected to a form so he can add a book. They must insert correctly the 13-digit ISBN (it cannot be changed afterwards), the title and publisher of the book. They are instructed to also provide with the pages, summary, image (URL) and language of the book, although not obligated. They are, however, obligated to insert at least one author (first, middle and last name in the corresponding fields), a category and a keyword. They can add more than one in these forms by clicking the add button, but they can not insert more than five in each category. After submitting the form, they are redirected to the View Library® page

Library

Create Book

\*ISBN  
Enter Pages

\*Title  
Enter Title

\*Publisher  
Enter Publisher

Pages  
Enter Pages

Summary  
Enter Summary

Image URL  
Enter Image

Language  
Enter Language

Authors:  
• Authors-0  
Author

Add Author

Keywords:  
• Keywords-0  
Keyword

Add Keyword

Categories:  
• Category Name

In the View Library® page, also accessible by the corresponding section in the operator main page, operators can view all of the Library® books, in any school. They can additionally view the available copies each book has. In any other regard the layout of the page is similar to the Browse Library® page, apart from the fact that they can search for available copies too. However the functionality is different, since after selecting a book an operator can only edit it. By clicking this button, the operator is redirected to the signup page, with the values of the book stored in the forms. Nonetheless, the operator needs to re-insert the authors, categories and keywords, so keep that in mind. The ISBN cannot be changed (it will result in an error message).

Library

Available books for just\_in

Search in: Titles, Categories, Authors

Search...

**Library**

145

- **Language:**  
Romanian
- **Keywords:**  
nonummy, semper
- **Availability:**  
16
- **Summary:**  
Cras mi pede, malesuada in, imperdier et, commodo vulputate, justo. In blandit ultrices enim. Lorem ipsum dolor sit amet, consectetur adipiscing elit.

**Edit  
(NOT ISBN)**



Search in: Titles, Authors, ISBNs, etc.

Search...

\*ISBN  
0299456389217

\*Title  
Networked user-facing open archite

\*Publisher  
Linktype

Pages  
145

Summary  
Cras mi pede, malesuada in, imperdi

Image URL  
<https://static-cse.canva.com/blob/92>

Language

Back to the operator page, the operator can view all the schools (valid) rentals and reservations by clicking on the corresponding sections. They can also delete them, but it is strongly discouraged.

Rental ID	Username	Book Name	#Copy	Rental Date	Deadline	Return Date
53	logan	Down-sized content-based secured line	105	2023-06-04	2023-06-11	2023-06-04
50	lisasa	Fundamental bandwidth-monitored benchmark	102	2023-04-26	2023-05-03	None
42	lance	Intuitive foreground intranet	192	2023-04-29	2023-05-06	None
33	lance	Programmable regional product	749	2023-04-23	2023-04-30	2023-04-30

The operator can also insert a copy. By filling the correct ISBN and the copy id, the copy is automatically then inserted into the system. We must note that the IDs of the copies are left as a responsibility of the school, since most likely they already had an ordering system before enrolling in Library®, so the operator must ensure its uniqueness (otherwise an error will appear)

Copy Insert

### Insert Copy

\*ISBN  
3456546656578

\*Copy ID  
678

Insert

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The operator has access to some statistics too. Review Stats provide him with the average rating as sorted by user or category with the ability to search independently and Black List gives him track of all the delayed rentals and their delayed days - again with search ability.z

**Black List**

Search in: Username, First Name, Last Name, Days Delayed

Rental Id	Username	First Name	Last Name	Rental Date	Days Delayed
8	paige	Estel	Danes	2023-04-28	30
28	migel	Zahara	Unitt	2023-04-25	33
3	jason	Mauricio	Latter	2023-04-25	33
17	kelly	Gustavo	Butteris	2023-04-24	34

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Finally, let's not forget that the operator is in fact a professor that can benefit from Library® just as much library can benefit from their service. Use Library® redirects him to his user page as a common professor!

Hello Jilleen Daveran!

**MyRentals®**  
View all of your [Rentals](#)

**MyReservations®**  
View all of your [Reservations](#)

**MyReviews®**  
View all of your [Reviews](#)

**Browse Library®**  
View all of the available books in your school and reserve the book of your choice! [View](#)

## Administrator

The administrator is the highest in Library®'s hierarchy. Admin's main page gives him everything he will ever need.



The administrator can approve operators for the school units. He can also delete their application, if they aren't yet accepted or have made any actions in the system as operators yet. He is advised to have one approved operator per school.

The screenshot shows the 'Operator Approval Page'. At the top, there's a 'Library®' header and a 'Operator Approval Page' title. Below is a table listing operator approvals:

Username	First name	Last name	School Name	Approved
jessica_p	Germayne	Rubenfeld	Jaxworks	sreppas ✓ ✗ 🗑
johndoe	Sibel	Filshin	Kwilith	sreppas ✓ ✗ 🗑
just_in	Jilleen	Daveran	Bubblemix	sreppas ✓ ✗ 🗑
kelly	Gustavo	Butteris	Bubblemix	sreppas ✓ ✗ 🗑
kattie	Baxy	Backes	Feedmix	sreppas ✓ ✗ 🗑

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The administrator is responsible for expanding Library® in other schools. It's their job to insert schools in the database, by filling the corresponding form. Keep in mind that they are also responsible for assigning a unique validator for each school. In case of duplicate entries, an error message will appear. After insertion, they are redirected to the list of all the schools, which is accessible through the admin main page as well.

**Library**

Create School

\*School ID

\*Name

\*Street Name

\*Street Number

\*City

\*Email

\*Phone

By just clicking one button and choosing a file, he can backup or restore the database. Simple as that.

As administrator, he also has access to certain statistics. In the statistics section he is redirected to a page that allows him to view the statistic of his choice.

**Library**

**Statistics**

**311**

List with the total number of loans per school (Search criteria: year, calendar month, e.g. January).

**Go!**

**312**

For a given book category (user-selected), which authors belong to it and which teachers have borrowed books from that category in the last year?

**Go!**

**313**

Find young teachers (age < 40 years) who have borrowed the most books and the number of books.

**Go!**

**314**

Find authors whose books have not been borrowed.

**Go!**

Library

316

First Category	Second Category	Total Rentals
comedy	drama	10
biography	scifi	10
biography	history	10

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Library

313

### Young Rentals

Username	First Name	Last Name	Age	Total Rentals
kelly	Gustavo	Butteris	12	1
johndoe	Sibel	Filshin	39	1
jessica_p	Germayne	Rubenfeld	21	1

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# ΟΔΗΓΙΕΣ ΕΓΚΑΤΑΣΤΑΣΗΣ ΚΑΙ GIT REPO

---

Το repository της βάσης δεδομένων μας, library®, στο github είναι το εξής:

<https://github.com/Rssssssss088/Database--Projects>

Ακολουθούν οδηγίες εγκατάστασης της εφαρμογής:

1. Πρώτο βήμα εγκατάστασης είναι η δημιουργία ενός clone του git repo της εφαρμογής στο τοπικό directory που επιθυμεί ο χρήστης. Αυτό μπορεί να γίνει είτε μέσω του GitHub desktop είτε γράφοντας σε terminal την παρακάτω εντολή:

```
git clone https://github.com/Rssssssss088/Database--Projects
```

ακολουθούμενο από local directory που επιθυμεί ο χρήστης.

2. Τώρα, εγκαθιστούμε την βάση στο στον υπολογιστή μας. Για αυτό το βήμα απαιτείται η σύνδεση με κάποιον mysql server. Εμείς χρησιμοποιούμε mysql μέσω XAMPP. Οπότε δεν μένει παρά να τρέξουμε τα DDL\_script.sql και DML\_script.
3. Σε αυτό το βήμα λανσάρουμε την εφαρμογή. Εκτελούμε την εντολή python3 run.py. Ανοίγουμε ένα browser και μπαίνουμε στην διεύθυνση localhost:4000.