Finalised ERD Diagram
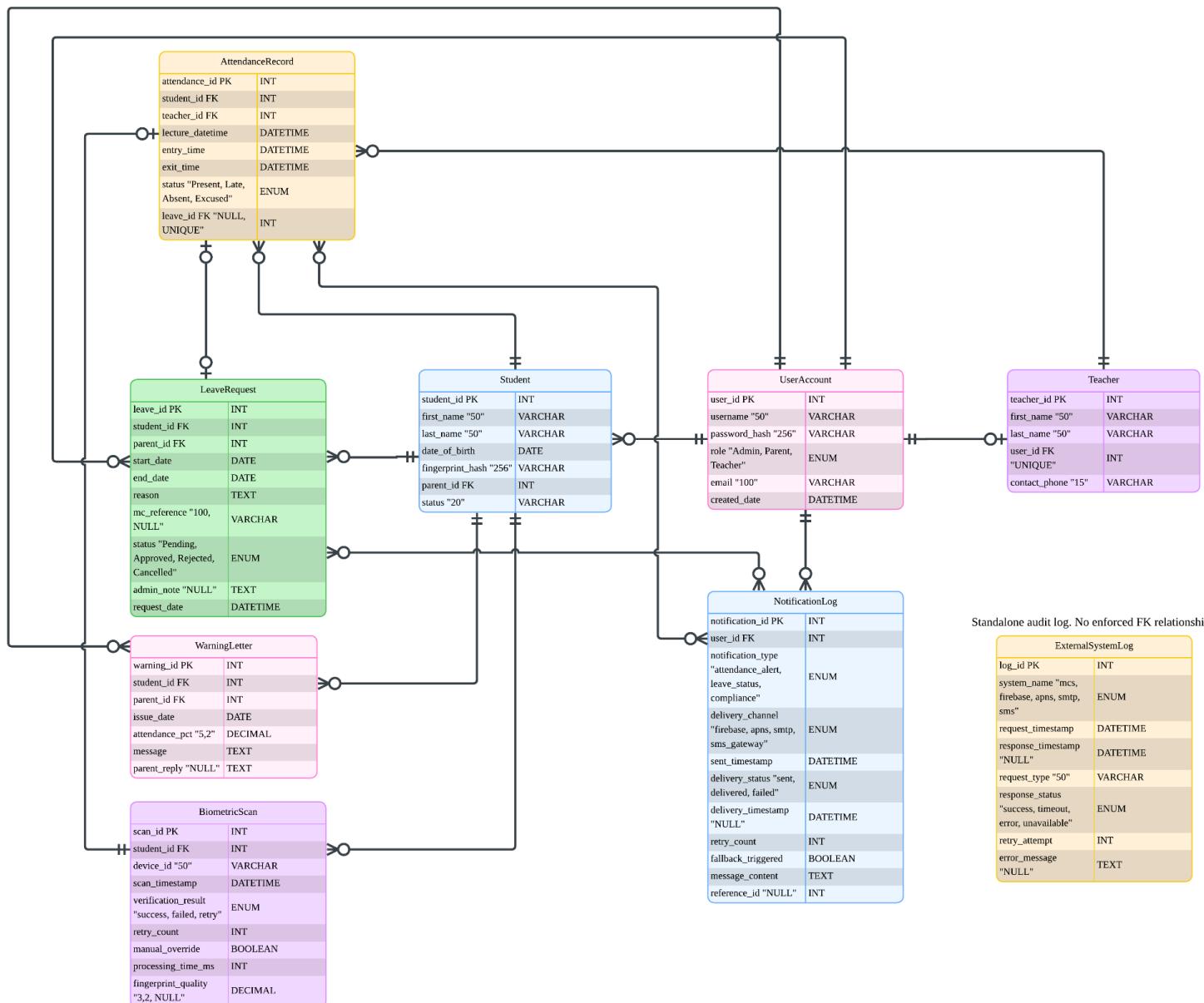
AttendanceRecord

Field	Type
attendance_id PK	INT
student_id FK	INT
teacher_id FK	INT
lecture_datetime	DATETIME
entry_time	DATETIME
exit_time	DATETIME
status "Present, Late, Absent, Excused"	ENUM
leave_id FK "NULL, UNIQUE"	INT

LeaveRequest

Field	Type
leave_id PK	INT
student_id FK	INT
parent_id FK	INT
start_date	DATE
end_date	DATE
reason	TEXT
mc_reference "100, NULL"	VARCHAR
status "Pending, Approved, Rejected, Cancelled"	ENUM
admin_note "NULL"	TEXT
request_date	DATETIME

Student

Field	Type
student_id PK	INT
first_name "50"	VARCHAR
last_name "50"	VARCHAR
date_of_birth	DATE
fingerprint_hash "256"	VARCHAR
parent_id FK	INT
status "20"	VARCHAR

UserAccount

Field	Type
user_id PK	INT
username "50"	VARCHAR
password_hash "256"	VARCHAR
role "Admin, Parent, Teacher"	ENUM
email "100"	VARCHAR
created_date	DATETIME

Teacher

Field	Type
teacher_id PK	INT
first_name "50"	VARCHAR
last_name "50"	VARCHAR
user_id FK "UNIQUE"	INT
contact_phone "15"	VARCHAR

WarningLetter

Field	Type
warning_id PK	INT
student_id FK	INT
parent_id FK	INT
issue_date	DATE
attendance_pct "5,2"	DECIMAL
message	TEXT
parent_reply "NULL"	TEXT

BiometricScan

Field	Type
scan_id PK	INT
student_id FK	INT
device_id "50"	VARCHAR
scan_timestamp	DATETIME
verification_result "success, failed, retry"	ENUM
retry_count	INT
manual_override	BOOLEAN
processing_time_ms	INT
fingerprint_quality "3,2, NULL"	DECIMAL

NotificationLog

Field	Type
notification_id PK	INT
user_id FK	INT
notification_type "attendance_alert, leave_status, compliance"	ENUM
delivery_channel "firebase, apns, smtp, sms_gateway"	ENUM
sent_timestamp	DATETIME
delivery_status "sent, delivered, failed"	ENUM
delivery_timestamp "NULL"	DATETIME
retry_count	INT
fallback_triggered	BOOLEAN
message_content	TEXT
reference_id "NULL"	INT

Standalone audit log. No enforced FK relationships.

ExternalSystemLog

Field	Type
log_id PK	INT
system_name "mcs, firebase, apns, smtp, sms"	ENUM
request_timestamp	DATETIME
response_timestamp "NULL"	DATETIME
request_type "50"	VARCHAR
response_status "success, timeout, error, unavailable"	ENUM
retry_attempt	INT
error_message "NULL"	TEXT

Legend:

- One to One
- One to Many(Mandatory)
- Many
- One and Only One(Mandatory)
- One or More(Mandatory)
- Zero or one(Optional)
- Zero or Many(Optional)