Code Files Explanation

Project: School Activity Booking System
Total Files: 50+
Lines of Code: 3,200+

PART 1: SIMPLE FILE OVERVIEW

Project Structure (Like a House)

School_Activity_Booking_System/
■
■■■ app.py ← The BRAIN (main logic)
■■■ config.py ← The SETTINGS (configuration)
■■■ requirements.txt ← The SHOPPING LIST (dependencies)
■■■ Procfile ← The INSTRUCTIONS (for deployment)
■
■■■ templates/ ← The PAGES (HTML files)
■ ■■■ base.html ← The TEMPLATE (all pages use this)
■ ■■■ login.html ← Parent login page
■ ■■■ dashboard.html ← Parent home page
■ ■■■ admin/ ← Admin pages folder
■ ■■■ tutor/ ← Tutor pages folder
■
■■■ static/ ← The DECORATION (CSS, images, JS)
■ ■■■ css/style.css ← The PAINT (styling)
■ ■■■ js/script.js ← The MAGIC (JavaScript)
■ ■■■ images/ ← The PICTURES
■
■■■ Documentation/ ← The MANUAL (user guides)
■■■ helpers/ ← The TOOLS (utility scripts)

PART 2: CORE FILES EXPLAINED

1. app.py - The Brain (1,300 lines)

Simple Explanation:
This is the main file - like your brain controls your body, app.py controls the whole website!
What's Inside:
Lines 1-50: Imports (Getting Tools)
from flask import Flask, render_template, request
from flask_sqlalchemy import SQLAlchemy
from flask_mail import Mail

Like gathering all your cooking utensils before starting

Lines 50-350: Database Models (Defining Things)
class Parent(db.Model):
# This defines what a "Parent" is
# Like a form: "Parent has name, email, phone"
class Child(db.Model):
# What is a "Child"?

Has name, age, grade, belongs to a parent
Lines 350-600: Helper Functions (Tools)
def send_email(recipient, subject, body):
# Tool for sending emails
def generate_pdf(booking):
# Tool for making PDF invoices
Lines 600-1300: Routes (The Pages)
@app.route('/login')
def login():
# What happens when you visit /login
@app.route('/dashboard')
def dashboard ():
# What happens when you visit /dashboard
Technical Breakdown:
Section	Lines	Purpose	Contributor
Imports	1-50	Dependencies	All
Configuration	51-80	App setup	Sanchit
Database Models	81-350	ORM definitions	Shiva
Security Functions	351-450	Auth/CSRF	Sanchit
Email Functions	451-550	SMTP/Templates	Chichebendu
PDF Functions	551-650	ReportLab	Chichebendu
Parent Routes	651-850	Parent portal	All
Admin Routes	851-1050	Admin CRUD	Sanchit
Tutor Routes	1051-1250	Tutor portal	Chichebendu
Helper Routes	1251-1300	API endpoints	Mohd
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2. config.py - The Settings (70 lines)

Simple Explanation:
Like the settings menu on your phone - controls how the app works in different situations!
What's Inside:
class Config:
# Basic settings everyone uses
SECRET_KEY = "super-secret-password"
class DevelopmentConfig(Config):
# Settings for testing on your computer
DEBUG = True # Show errors
DATABASE = "test.db" # Small test database
class ProductionConfig(Config):
# Settings for real users on internet
DEBUG = False # Hide errors from users
DATABASE = "real-database.postgresql" # Big real database
Technical Details:
import os
from datetime import timedelta
class Config:
"""Base configuration"""
SECRET_KEY = os.environ.get('SECRET_KEY') or os.urandom(32).hex()
SQLALCHEMY_TRACK_MODIFICATIONS = False
WTF_CSRF_ENABLED = True
SESSION_COOKIE_HTTPONLY = True
SESSION_COOKIE_SAMESITE = 'Lax'
PERMANENT_SESSION_LIFETIME = timedelta(hours=24)
class DevelopmentConfig(Config):
"""Development settings"""
DEBUG = True
TESTING = False

SQLALCHEMY_DATABASE_URI = 'sqlite:///dev.db'
SQLALCHEMY_ECHO = True # Log all SQL queries
MAIL_DEBUG = True
class ProductionConfig(Config):
"""Production settings"""
DEBUG = False
TESTING = False
SQLALCHEMY_DATABASE_URI = os.environ.get('DATABASE_URL')
SESSION_COOKIE_SECURE = True # HTTPS only
SQLALCHEMY_POOL_SIZE = 20
SQLALCHEMY_MAX_OVERFLOW = 40
Contributor: Sanchit (Configuration architecture)
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3. templates/ - The HTML Pages (18 files)

Simple Explanation:
These are the web pages you see! Like different rooms in a house.
Base Template (base.html):
School Booking
...
{% block content %}{% endblock %}
...
All Templates:
Parent Portal (5 files):
1. `login.html` - Login page (email + password form)
2. `register.html` - Sign up page (create account)
3. `dashboard.html` - Home page (see your bookings)
4. `activities.html` - Browse activities (swimming, art, etc.)
5. `booking_success.html` - Confirmation page (booking confirmed!)
Admin Portal (6 files):
1. `admin/login.html` - Admin login
2. `admin/dashboard.html` - Statistics dashboard
3. `admin/activities.html` - Manage activities list
4. `admin/create_activity.html` - Add new activity form
5. `admin/edit_activity.html` - Edit activity details
6. `admin/bookings.html` - View all bookings
Tutor Portal (4 files):
1. `tutor/login.html` - Tutor login
2. `tutor/dashboard.html` - Tutor home (their activities)
3. `tutor/attendance.html` - Mark attendance form
4. `tutor/attendance_history.html` - View past attendance
General (3 files):
1. `base.html` - Template foundation
2. `index.html` - Homepage (public, before login)
3. `error.html` - Error page (404, 500)
Technical Details - Template Inheritance:
{% block title %}School Booking{% endblock %}
{% block content %}{% endblock %}
{% extends "base.html" %}
{% block title %}Parent Dashboard{% endblock %}
{% block content %}
Welcome, {{ parent.full_name }}!
{% endblock %}
Contributors:
- Parent templates: All team members
- Admin templates: Sanchit
- Tutor templates: Chichebendu
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4. static/css/style.css - The Styling (500 lines)

Simple Explanation:
Makes the website look pretty! Like interior design for web pages.
What's Inside:
/* Colors and Fonts */
:root {
--primary-color: #667eea; /* Purple */
--secondary-color: #764ba2; /* Dark purple */
--success-color: #10b981; /* Green */
--danger-color: #ef4444; /* Red */
}
/* Buttons */
.btn {
padding: 12px 24px;
border-radius: 8px;
cursor: pointer;
transition: all 0.3s;
}
.btn:hover {
transform: scale(1.05); /* Grow slightly on hover */
box-shadow: 0 4px 12px rgba(0,0,0,0.2);
}
/* Cards */
.activity-card {
background: white;
border-radius: 12px;
padding: 20px;
box-shadow: 0 2px 8px rgba(0,0,0,0.1);
}
/* Animations */
@keyframes fadeIn {
from { opacity: 0; }
to { opacity: 1; }
}
Structure:
Section	Lines	Purpose
CSS Variables	1-30	Colors, fonts
Reset Styles	31-60	Browser defaults
Layout	61-150	Grid, flexbox
Components	151-300	Buttons, cards, forms
Utilities	301-400	Spacing, colors
Animations	401-500	Transitions, keyframes
Contributor: Team effort (design decisions by all)
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5. static/js/script.js - The JavaScript (400 lines)

Simple Explanation:
Makes the website interactive! Like adding motion sensors and automatic doors.
What's Inside:
// AJAX Delete (Delete without page reload)
function deleteActivity(id) {
if (!confirm('Are you sure?')) return;
fetch(`/admin/delete_activity/${id}`, {
method: 'POST',

```
headers: {
'X-CSRFToken': getCsrfToken()
}
})
.then(response => response.json())
.then(data => {
if (data.success) {
// Remove from page smoothly
document.getElementById(`activity-${id}`).remove();
showNotification('Deleted successfully!');
}
});
}
// Lazy Image Loading
const observer = new IntersectionObserver((entries) => {
entries.forEach(entry => {
if (entry.isIntersecting) {
entry.target.src = entry.target.dataset.src;
}
});
});
// Form Validation
function validateEmail(email) {
const regex = /^[^\s@]+@[^\s@]+\.[^\s@]+$/;
return regex.test(email);
}
```

Structure:

Section	Lines	Purpose	Contributor
AJAX Functions	1-150	Async requests	Mohd
Lazy Loading	151-200	Image optimization	Mohd
Form Validation	201-280	Client validation	Mohd
UI Helpers	281-350	Notifications, modals	Mohd
Cache Manager	351-400	LocalStorage	Mohd

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6. Helper Scripts (5 files)

populate_db.py (200 lines)
Simple Explanation:
Creates fake demo data for testing. Like putting mannequins in a store before it opens!

Creates:

```
admin = Admin(email='admin@greenwood.com', password='admin123')
parent = Parent(email='john@email.com', full_name='John Smith')
child = Child(name='Emma', age=8, grade=3, parent_id=parent.id)
tutor = Tutor(full_name='Dr. Sarah Jenkins', specialization='Swimming')
activity = Activity(name='Swimming Lessons', price=25.00, max_capacity=15)
```

Result: Complete test database ready to use!

Technical Implementation:

```
from app import app, db, Parent, Child, Activity, Tutor, Admin, Booking
from werkzeug.security import generate_password_hash
from datetime import datetime, timedelta
def populate_database():
```

```
# Clear existing data
db.drop_all()
db.create_all()
# Create admin
admin = Admin(
email='admin@greenwood.com',
full_name='System Administrator',
password_hash=generate_password_hash('admin123')
)
db.session.add(admin)
# Create parent + children
parent = Parent(
email='john.smith@email.com',
full_name='John Smith',
phone='07123456789',
password_hash=generate_password_hash('password123')
)
db.session.add(parent)
db.session.commit() # Commit to get parent.id
child1 = Child(
name='Emma Smith',
age=8,
grade=3,
parent_id=parent.id
)
child2 = Child(
name='Oliver Smith',
age=11,
grade=6,
parent_id=parent.id
)
db.session.add_all([child1, child2])
# Create 6 tutors with specializations
tutors_data = [
('Dr. Sarah Jenkins', 'Swimming', 'sarah.jenkins@greenwood.com'),
('Mr. David Chen', 'Art', 'david.chen@greenwood.com'),
('Ms. Emily Brown', 'Music', 'emily.brown@greenwood.com'),
('Mr. James Wilson', 'Coding', 'james.wilson@greenwood.com'),
('Ms. Lisa Taylor', 'Drama', 'lisa.taylor@greenwood.com'),
('Mr. Ahmed Khan', 'Sports', 'ahmed.khan@greenwood.com')
]
tutors = []
for name, spec, email in tutors_data:
tutor = Tutor(
full_name=name,
email=email,
specialization=spec,
password_hash=generate_password_hash('tutor123')
)
tutors.append(tutor)
db.session.add_all(tutors)
db.session.commit()
# Create 8 activities
activities_data = [
('Swimming Lessons', 'Beginner swimming for ages 6-8', 25.00, 15, 0, 'Monday', '15:00', '16:00'),
('Art Class', 'Creative painting and drawing', 20.00, 12, 1, 'Tuesday', '14:00', '15:30'),
('Music Lessons', 'Piano and guitar basics', 30.00, 8, 2, 'Wednesday', '16:00', '17:00'),
('Coding Club', 'Python programming for kids', 35.00, 10, 3, 'Thursday', '15:30', '17:00'),
('Drama Workshop', 'Acting and stage performance', 22.00, 20, 4, 'Friday', '14:00', '16:00'),
('Football Training', 'Team sports and fitness', 18.00, 25, 5, 'Monday', '16:00', '17:30'),
```

('Chess Club', 'Strategic thinking and chess', 15.00, 16, 3, 'Tuesday', '15:00', '16:00'),
('Dance Class', 'Ballet and contemporary dance', 28.00, 14, 2, 'Wednesday', '14:30', '16:00')
]
for name, desc, price, capacity, tutor_idx, day, start, end in activities_data:
activity = Activity(
name=name,
description=desc,
price=price,
max_capacity=capacity,
tutor_id=tutors[tutor_idx].id,
day_of_week=day,
start_time=start,
end_time=end
)
db.session.add(activity)
db.session.commit()
print("■ Database populated successfully!")
print(f" - Created 1 admin")
print(f" - Created 1 parent with 2 children")
print(f" - Created 6 tutors")
print(f" - Created 8 activities")
if __name__ == '__main__':
with app.app_context():
populate_database()
Contributor: Shiva (data generation)
---

convert_to_pdf.py (80 lines)
Simple Explanation:
Converts markdown documentation to PDF files. Like a printer that reads .md files!

Finds all .md files in Documentation/

Converts each to PDF

Saves in same folder

Example:

1_Sanchit_Contribution.md → 1_Sanchit_Contribution.pdf

Contributor: Chichebendu (PDF utilities)

PART 3: DATABASE FILES

school_booking.db
Simple Explanation:
The filing cabinet where all data is stored! Every parent, child, booking - everything!
Structure (SQLite):
Tables:
■■■ parent (stores parent accounts)
■■■ child (stores children info)

■■■ activity (stores available activities)
■■■ tutor (stores tutor accounts)
■■■ booking (stores all bookings)
■■■ waitlist (stores queue when full)
■■■ attendance (stores attendance records)
■■■ admin (stores admin accounts)
Size: ~5MB with sample data
Records: ~100 sample records
Technical Schema:
-- Example table structure
CREATE TABLE parent (
id INTEGER PRIMARY KEY AUTOINCREMENT,
email VARCHAR(120) UNIQUE NOT NULL,
full_name VARCHAR(100) NOT NULL,
phone VARCHAR(20) NOT NULL,
password_hash VARCHAR(255) NOT NULL,
created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
last_login TIMESTAMP
);
CREATE INDEX idx_parent_email ON parent(email);
CREATE TABLE booking (
id INTEGER PRIMARY KEY AUTOINCREMENT,
parent_id INTEGER NOT NULL,
child_id INTEGER NOT NULL,
activity_id INTEGER NOT NULL,
date DATE NOT NULL,
status VARCHAR(20) DEFAULT 'pending',
payment_status VARCHAR(20) DEFAULT 'pending',
created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
FOREIGN KEY (parent_id) REFERENCES parent(id),
FOREIGN KEY (child_id) REFERENCES child(id),
FOREIGN KEY (activity_id) REFERENCES activity(id),
UNIQUE(child_id, activity_id, date)
);
CREATE INDEX idx_booking_status ON booking(status);
CREATE INDEX idx_booking_date ON booking(date);
Contributor: Shiva (schema design)

PART 4: CONFIGURATION FILES

requirements.txt
Simple Explanation:
Shopping list of Python packages needed. Like ingredients list for a recipe!
Flask==2.3.0 # Web framework
Flask-SQLAlchemy==3.0.5 # Database
Flask-Mail==0.9.1 # Email
Flask-WTF==1.1.1 # Forms + CSRF
ReportLab==4.0.4 # PDF generation
Werkzeug==2.3.0 # Security utilities
python-dotenv==1.0.0 # Environment variables
gunicorn==21.2.0 # Production server
psycopg2-binary==2.9.9 # PostgreSQL
email-validator==2.0.0 # Email validation
WTForms==3.0.1 # Form validation
SQLAlchemy==2.0.20 # ORM core
Contributors: All team members

Procfile
Simple Explanation:
Instructions for deployment server on how to run the app!
web: gunicorn --workers 4 --threads 2 --timeout 120 --bind 0.0.0.0:$PORT app:app
Translation:
- `web:` - This is a web application
- `gunicorn` - Use Gunicorn server
- `--workers 4` - Run 4 worker processes
- `--threads 2` - 2 threads per worker
- `--timeout 120` - Wait 120 seconds max
- `--bind 0.0.0.0:$PORT` - Listen on all interfaces, port from environment
- `app:app` - Run the "app" variable from "app.py"
Contributor: Sanchit (deployment config)

.env.example
Simple Explanation:
Template for secrets file. Like a form you fill in with your passwords!

Copy this file to .env and fill in YOUR values

SECRET_KEY=change-this-to-random-64-character-string
GMAIL_USER=your-email@gmail.com
GMAIL_APP_PASSWORD=your-16-character-app-password
DATABASE_URL=sqlite:///school_booking.db
Contributor: Sanchit (security config)

PART 5: DOCUMENTATION FILES

All in /Documentation folder:
1. `1_Sanchit_Kaushal_Contribution.md` (30 pages)
2. `2_Chichebendu_Umeh_Contribution.md` (28 pages)
3. `3_Shiva_Kasula_Contribution.md` (35 pages)
4. `4_Mohd_Sharjeel_Contribution.md` (32 pages)
5. `5_Team_Collated_Documentation.md` (40 pages)
6. `6_Requirements_and_Installation.md` (25 pages)
7. `7_Code_Files_Explanation.md` (this file)
Plus PDFs of all the above!

PART 6: PROJECT STATISTICS

Code Metrics:
Total Files: 52
■■■ Python: 8 files (3,200 lines)
■■■ HTML: 18 files (1,800 lines)
■■■ CSS: 2 files (600 lines)
■■■ JavaScript: 1 file (400 lines)
■■■ Documentation: 7 MD files (200+ pages)
Total Lines of Code: ~6,000
Comments: ~800 lines (13% documentation)
Blank Lines: ~600 lines
File Size Distribution:

Largest Files:
1. app.py - 1,300 lines (main application)
2. static/css/style.css - 500 lines (styling)
3. static/js/script.js - 400 lines (interactivity)
4. populate_db.py - 200 lines (test data)
5. config.py - 70 lines (configuration)
Database Statistics:
Tables: 8
Relationships: 12 foreign keys
Indexes: 15 (optimized queries)
Constraints: 8 (data integrity)
Sample Data: 100+ records

PART 7: VIVA Q&A;

Q1: Explain the purpose of base.html and template inheritance.
Simple: "base.html is like a house foundation - all pages build on top of it. Navigation and footer are in base.html so we don't repeat them 18 times!"
Technical: "Template inheritance using Jinja2's `{% extends %}` and `{% block %}` tags enables DRY principle. base.html defines common layout, child templates override specific blocks. Reduces code duplication from ~800 lines to ~200 lines across all templates."

Q2: Why separate static files from templates?
Simple: "Templates = HTML (structure), Static = CSS/JS/images (decoration). Like separating blueprint from paint/furniture. Makes organization clearer!"
Technical: "Separation of concerns - Flask serves static files via different route (/static/) with caching headers. Templates are processed server-side (Jinja2), static files served as-is. Enables CDN deployment and browser caching for performance."

Q3: Explain the database initialization process.
Simple: "populate_db.py creates empty database, then fills it with demo data. Like building a library (empty), then adding books (data)!"
Technical:
db.drop_all() # Delete existing tables
db.create_all() # Create new tables from models

Add sample data

db.session.add(admin)
db.session.add(parent)
db.session.commit() # Save to database
Models define schema via SQLAlchemy ORM. `create_all()` generates SQL DDL statements. Transaction ensures atomic creation."

Conclusion

The codebase demonstrates modular architecture with clear separation of concerns. Each component serves a specific purpose, from core application logic (app.py) to presentation (templates) to styling (CSS) to interactivity (JavaScript). Helper scripts automate deployment and testing. Comprehensive documentation ensures maintainability.
Total Project Size:
- 52 files
- 6,000+ lines of code

- 200+ pages of documentation
- 4 team members
- 7 weeks development

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