

System and Software Architecture Description (SSAD)



Team 02

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Version History

Date	Author	Version	Changes made	Rationale
10/13/16	Preksha	1.0	<ul style="list-style-type: none">Added System Context Diagram.Added Use-Case Diagram.	<ul style="list-style-type: none">Initial draft for FC Package
10/15/16	Preksha & Heidi	1.1	<ul style="list-style-type: none">Added Artifacts & Information DiagramAdded Purpose and Status of SSADAdded System Analysis OverviewAdded Process Description and Typical Course of Action for each Use Case	<ul style="list-style-type: none">Completed for FC Package
11/23/16	Snehal	1.2	<ul style="list-style-type: none">Added software components descriptionAdded process realization diagram	<ul style="list-style-type: none">Draft for As-Built Package
11/30/16	Snehal & Preksha	1.3	<ul style="list-style-type: none">Added Design ClassesDesign RationaleAdded Architectural Styles, Patterns and Frameworks	<ul style="list-style-type: none">Completed for As-Built Package

Table of Contents

System and Software Architecture Description (SSAD)	i
Version History	ii
Table of Contents	iii
Table of Tables	iv
Table of Figures.....	vi
1. Introduction.....	1
1.1 Purpose of the SSAD	1
1.2 Status of the SSAD	1
2. System Analysis.....	2
2.1 System Analysis Overview	2
2.2 System Analysis Rationale.....	15
3. Technology-Independent Model.....	16
4. Technology-Specific System Design	17
4.1 Design Overview	17
4.2 Design Rationale.....	24
5. Architectural Styles, Patterns and Frameworks.....	29

Table of Tables

<i>Table 1: Actors Summary.....</i>	<i>3</i>
<i>Table 2: Artifacts and Information Summary</i>	<i>4</i>
<i>Table 3: Process Description – Register and Pay Online</i>	<i>8</i>
<i>Table 4: Typical Course of Action – Register and Pay Online.....</i>	<i>8</i>
<i>Table 5: Process Description – Announcement Section.....</i>	<i>9</i>
<i>Table 6: Typical Course of Action – Announcement Section</i>	<i>9</i>
<i>Table 7: Process Description – Event Calendar</i>	<i>10</i>
<i>Table 8: Typical Course of Action – Event Calendar.....</i>	<i>10</i>
<i>Table 9: Process Description – Download Music Notes.....</i>	<i>10</i>
<i>Table 10: Typical Course of Action – Download Music Notes</i>	<i>11</i>
<i>Table 11: Process Description – Roster</i>	<i>11</i>
<i>Table 12: Typical Course of Action – Roster.....</i>	<i>11</i>
<i>Table 13: Process Description – View Video Trailer.....</i>	<i>12</i>
<i>Table 14: Typical Course of Action – View Video Trailer</i>	<i>12</i>
<i>Table 15: Process Description – Buy DVD</i>	<i>12</i>
<i>Table 16: Typical Course of Action – Buy DVD.....</i>	<i>12</i>
<i>Table 17: Process Description – Single Website</i>	<i>13</i>
<i>Table 18: Typical Course of Action – Single Website</i>	<i>13</i>
<i>Table 19: Process Description – Contact Us</i>	<i>13</i>
<i>Table 20: Typical Course of Action – Contact Us.....</i>	<i>14</i>
<i>Table 21: Process Description – View Yearbook</i>	<i>14</i>
<i>Table 22: Typical Course of Action – View Yearbook.....</i>	<i>14</i>
<i>Table 23: Process Description – Make Donation.....</i>	<i>14</i>
<i>Table 24: Typical Course of Action – Make Donation.....</i>	<i>14</i>
<i>Table 25: Software Component Description.....</i>	<i>18</i>
<i>Table 26: Supporting Software Component Description.....</i>	<i>19</i>
<i>Table 27: Design Class Description.....</i>	<i>21</i>

<i>Table 28: Design Class Description</i>	21
<i>Table 29: Design Class Description</i>	21
<i>Table 30: Architectural Styles, Patterns and Frameworks</i>	25

Table of Figures

<i>Figure 1: System Context Diagram</i>	<i>2</i>
<i>Figure 2: Artifacts and Information Diagram.....</i>	<i>4</i>
<i>Figure 3: Use Case Diagram -Online Registration and Payment System.....</i>	<i>5</i>
<i>Figure 4: Use Case Diagram: Announcement Section.....</i>	<i>6</i>
<i>Figure 5: Use Case Diagram -For User.....</i>	<i>7</i>
<i>Figure 6: Use Case Diagram -For Donor.....</i>	<i>7</i>
<i>Figure 7: Software Component Class Diagram</i>	<i>17</i>
<i>Figure 8:Supporting Software Component Class Diagram.....</i>	<i>18</i>
<i>Figure 9: Design Class Diagram-Registration System</i>	<i>20</i>
<i>Figure 10: Design Class Diagram-Announcement System</i>	<i>20</i>
<i>Figure 11: Design Class Diagram-Remaining System.....</i>	<i>20</i>
<i>Figure 12: Sequence Diagram – Online Registration and Payment</i>	<i>22</i>
<i>Figure 13:Sequence Diagram - Announcements</i>	<i>23</i>

1. Introduction

1.1 Purpose of the SSAD

The purpose of SSAD is to provide detailed description about the system architecture and its various components. It includes system context diagram which demonstrates the interaction among the various systems involved. Also, Use case diagrams demonstrate various actors and their interaction with the system.

1.2 Status of the SSAD

The status of this SSAD is currently at the version number 1.1, which will be submitted along with Foundations Commitment Package. This version will be reviewed with the necessary stakeholders and if there are no changes to be made, the latest version of this document will be delivered to the client.

2. System Analysis

2.1 System Analysis Overview

VYMA is dedicated to helping young musicians feel successful through learning and sharing music. The new system is developed using Squarespace (COTS). In order to achieve this goal, the new developed system has online Registration and Payment System which is *faster* and *efficient* than mailed application. Previously, registration and payment process used to take 2 weeks. However, the new system will reduce this time to 10 minutes. The new developed system will reduce the *redundancy* by combining the three Websites (Wordpress, Shutterfly and MailChimp) and will be easy to maintain. In new system, on updating the Announcement section, an email notification will be triggered to the user. Using Squarespace's Search Engine Optimization feature, larger audience can be reached. Squarespace's Donation Block is also being utilized to provide Secure Donation feature. The new system will retain the features present in existing system like Download Music Notes.

2.1.1 System Context

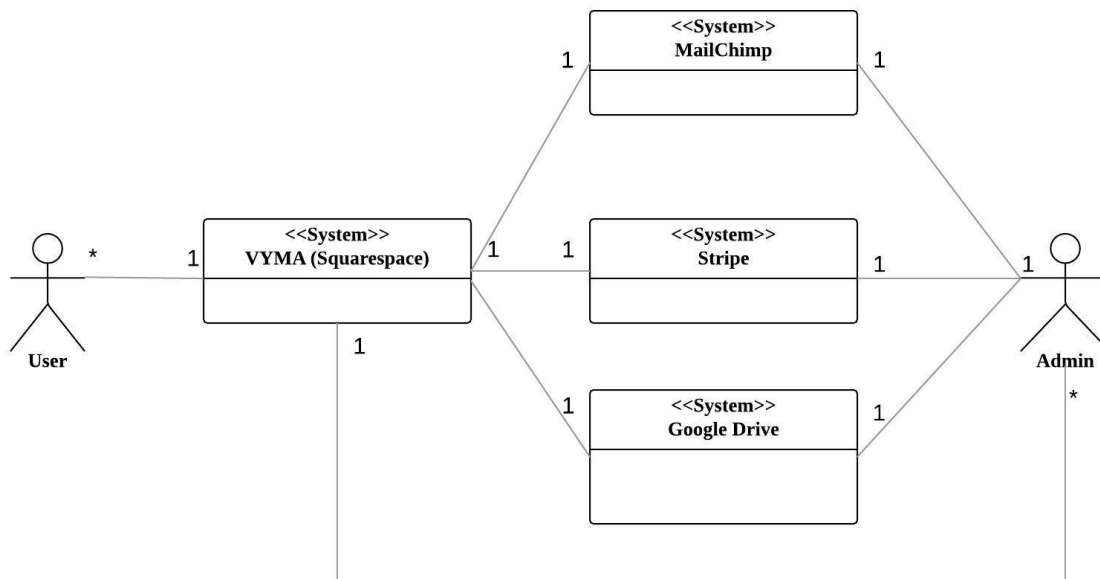


Figure 1: System Context Diagram

Table 1: Actors Summary

Actor	Description	Responsibilities
User	User of the system can either be parent or student who are older than 18 years.	<ul style="list-style-type: none">• Register and Pay for courses online.• View Announcements.• Download Music Notes for Rehearsals• View Event Calendar• Give Feedbacks on Contact Us Page• View Parent's Details on Roster
Admin	Admin of the system is the client who will maintain the website in future using Squarespace Control Panel.	<ul style="list-style-type: none">• Manage Registration and Payment.• Update the content (add new courses) on VYMA website.• Update the Event Calendar• Update the Announcement section• Update Parent's details on roster• Upload Music Notes• Manage Stripe for Payment• Manage MailChimp to update the mailing list to send notifications to users on update of Announcement Section.

2.1.2 Artifacts & Information

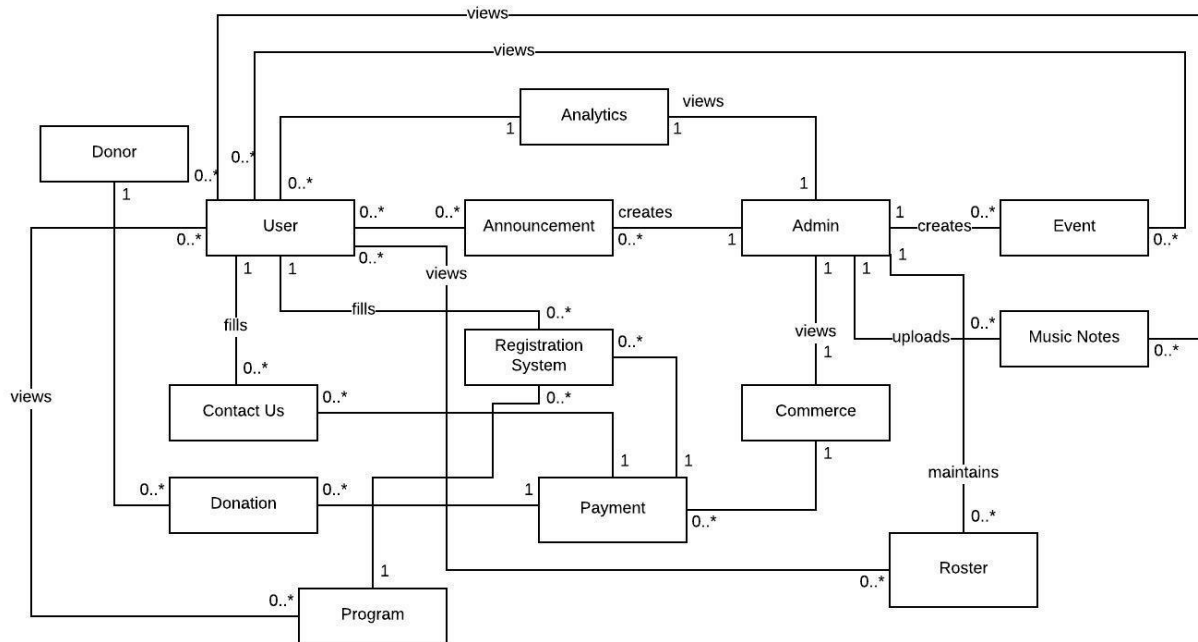


Figure 2: Artifacts and Information Diagram

Table 2: Artifacts and Information Summary

Artifact	Purpose
ATF-1: Registration System	Contains all information for completing an application for admission into a music program, including: contact information, instrument of preference and experience
ATF-2: Contact Us	Contains all information necessary for making an inquiry and/or providing feedback to VYMA including contact information, and message
ATF-3: Donations	Contains all information necessary for making a donation, including contact information and donation amount
ATF-4: Event	Contains the information about an event in the Calendar, including title and date.
ATF-5: Announcement	Contains all information about an announcement and notifications for VYMA community and general public, including title and message
ATF-6: Payment	Contains all information for making a payment to VYMA including payment amount, contact and billing information.
ATF-7: Admin	Contains all information about admin, including email address and password

ATF-8: Commerce	Exports information containing all of the registration payments completed, donations, discounts and DVD orders
ATF-9: Analytics	Contains all the information about website traffic
ATF-10: User	Contains information about the user including email address, and contact information
ATF-11: Program	Contains information about a music program including tuition, student eligibility and audition dates
ATF-12: Music Notes	Contains music notes for concerts practice/rehearsals.
ATF-13: Donor	Contains information about Donor including contact information
ATF-14: Roster	Contains all information about students' parents: contact information

2.1.3 Behavior

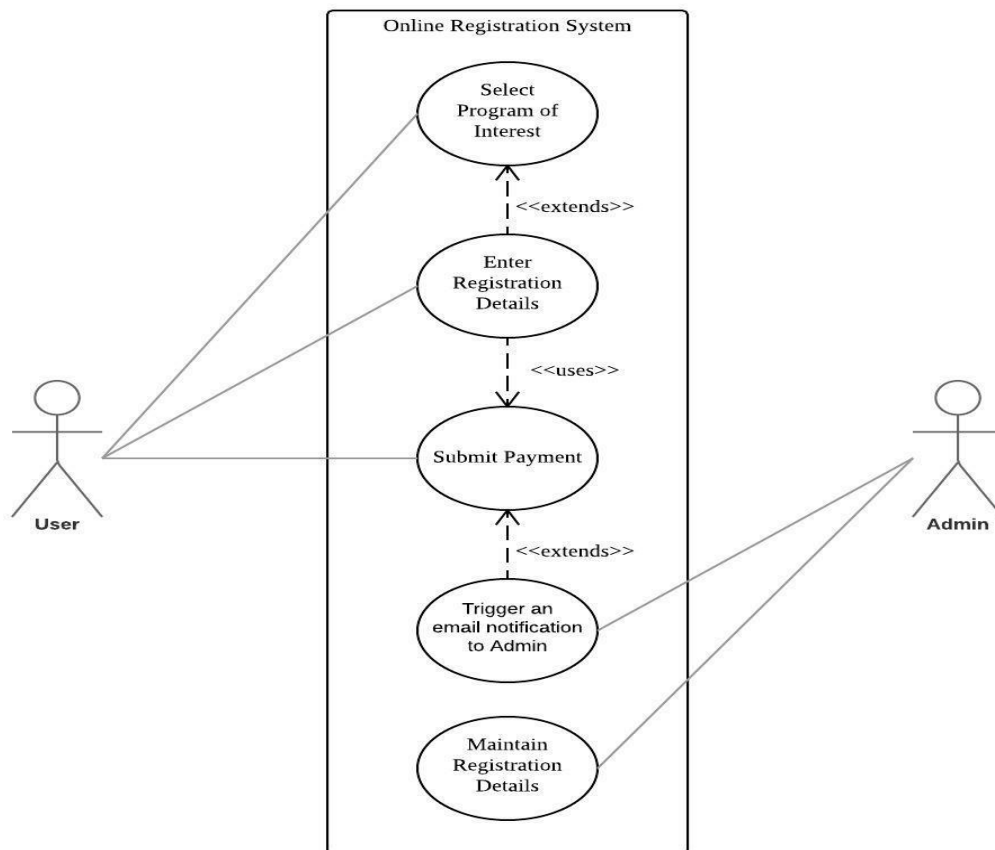


Figure 3: Use Case Diagram: Registration and Payment System

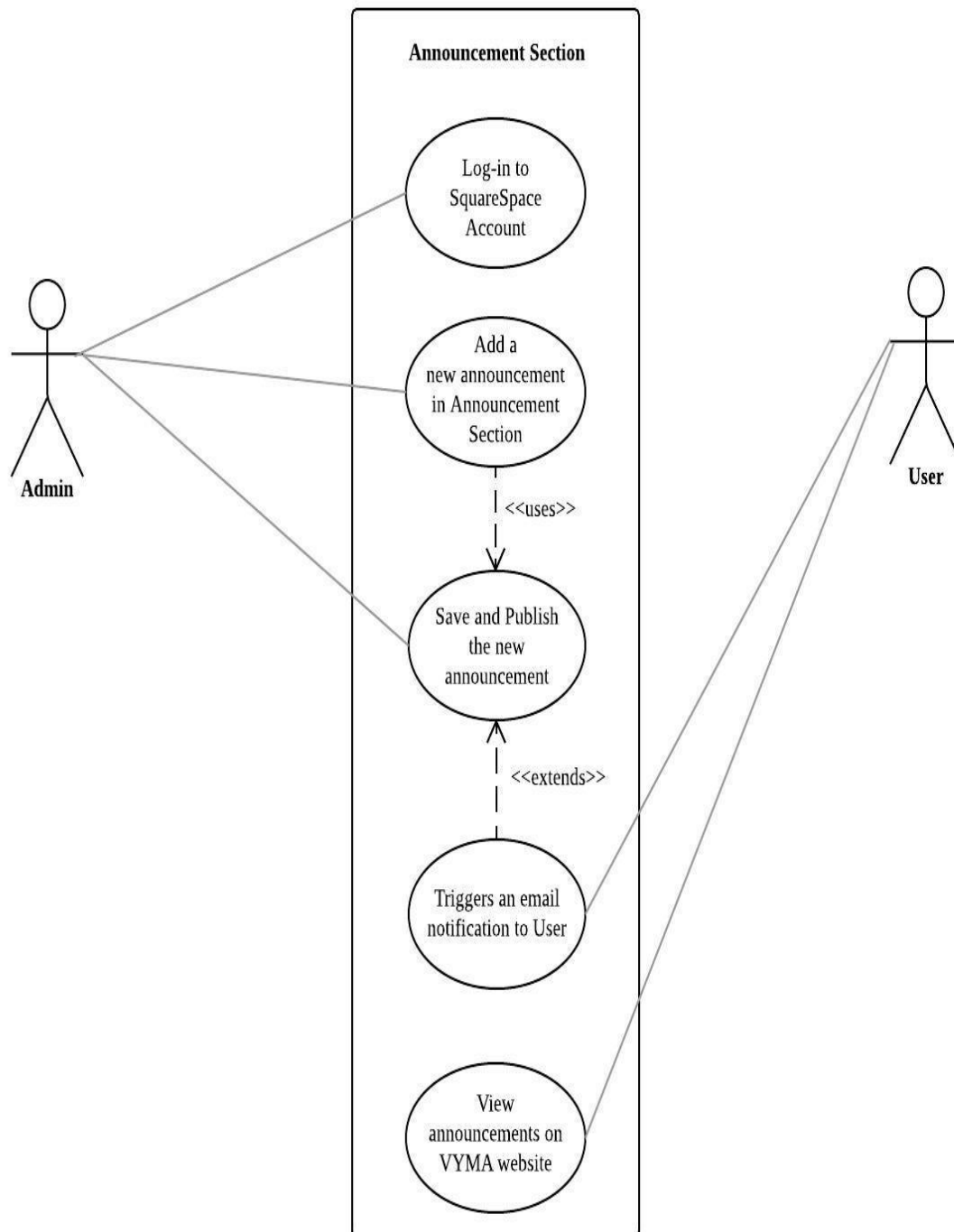


Figure 4: Use Case Diagram: Announcement Section

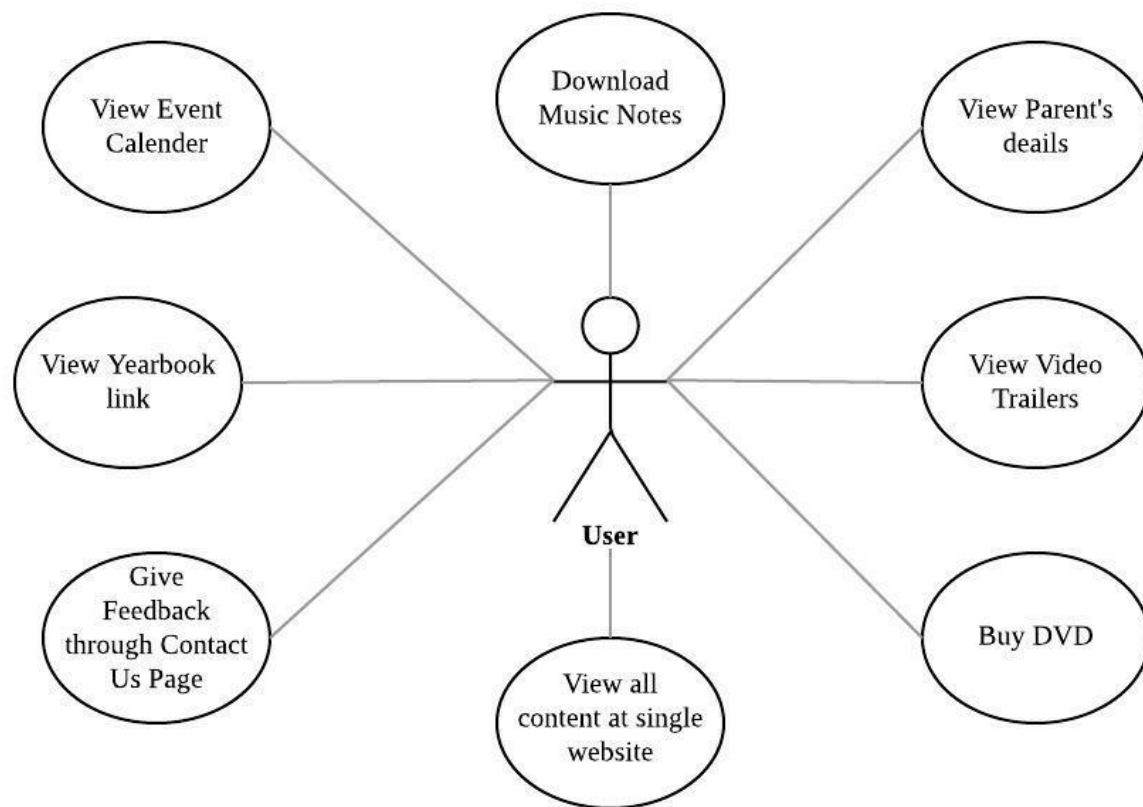


Figure 5: Use Case Diagram: For User

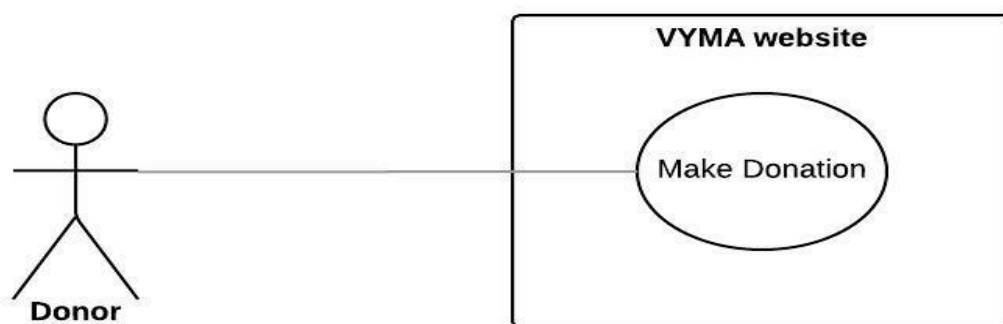


Figure 6: Use Case Diagram: For Donor

Use Case Sequence	Use Case
UC-1	Register and Pay Online
UC-2	View Announcements
UC-3	View Event Calendar
UC-4	Download Music Notes
UC-5	View Roster Page
UC-6	View Video Trailers
UC-7	Buy DVD
UC-8	View all Content at single websites
UC-9	Give Feedback
UC-10	View Yearbook
UC-11	Make Donation

Use Case List

2.1.3.1 Capability: Registration and Payment System

2.1.3.1.1 Process: Register and Pay Online

Table 3: Process Description-Register and Pay Online

Identifier	UC-1: Register and Pay Online
Purpose	Allows user to register and pay for courses online
Requirements	WC_4223, WC_4199
Development Risks	COTS Integration: Squarespace and Stripe
Pre-conditions	User chooses a course to register
Post-conditions	User is registered for the course

Table 4: Typical Course of Action- Register and Pay Online

Seq#	Actor's Action	System's Response
1	User clicks on the Program tab	

2		System shows different Programs.
3	User clicks on the Program of his choice	
4		System opens a page with that program's details.
5	User chooses the Term from dropdown list	
6	User clicks on register button	
7		System open a pop up form
8	User fills his details in the form and clicks on submit	
9		System adds that program to the Cart
10	User opens the cart and make payment	
11		System sends a confirmation mail to user and Admin
12	Admin can go to admin control panel to manage registration and payment	

2.1.3.2 Capability: Announcement System

2.1.3.2.1 Process: View Announcements

Table 5: Process Description- Announcement Section

Identifier	UC-2: View Announcement
Purpose	Admin publishes Announcements on VYMA website which can be viewed by the user. User gets email notifications for the same.
Requirements	WC_4210
Development Risks	COTS Integration: Squarespace and MailChimp
Pre-conditions	None
Post-conditions	User receives an email Notification

Table 6: Typical Course of Action- Announcement Section

Seq#	Actor's Action	System's Response
1	Admin logs into the Squarespace account.	
2	Admin adds new Announcement in the Announcement Sections and publishes it.	

3		System shows newly added announcement in the announcement section
4		System sends an email notification to the Users
5	Users view the announcement in the announcement section	

2.1.3.3 Capability: Event Calendar

2.1.3.3.1 Process: View Event Calendar

Table 7: Process Description

Identifier	UC-3: View Event Calendar
Purpose	Allows user to view event and its details in Event Calendar
Requirements	WC_4212
Development Risks	None
Pre-conditions	User knows the password to view details of Event
Post-conditions	None

Table 8: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User views event calendar on Homepage with limited details.	
2	User clicks on event to view more details	
3		System opens a page which prompts for password
4	User enters the password	
5		System opens a page with event details.

2.1.3.4 Capability: Music Notes

2.1.3.4.1 Process: Download Music Notes

Table 9: Process Description

Identifier	UC-4: Download Music Notes
Purpose	Allows users to download Music Notes from password protected page
Requirements	WC_4226

Development Risks	None
Pre-conditions	User knows the password to download Music notes
Post-conditions	None

Table 10: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on Members tab and select Download Music Notes from Dropdown	
2		System opens a page which prompts for password
3	User enters the password	
4		System opens a page with links to music notes.
5	User downloads the Music notes	

2.1.3.5 Capability: Roster

2.1.3.5.1 Process: View Roster Page

Table 11: Process Description

Identifier	UC-5: View Roster page
Purpose	Allows parents to view other's parent's details on roster page
Requirements	WC_4203
Development Risks	None
Pre-conditions	User knows the password to download Music notes
Post-conditions	None

Table 12: Typical Course of Action

Seq#	Actor's Action	System's Response
1	Admin logs into Squarespace	
2	Admin updates the Roster page and publish the details	
3		System shows the roster page with parent's details
4	User clicks on Roster page	
5		System asks for Password
6	User enters the password and view Roster page	

2.1.3.6 Capability: Trailers

2.1.3.6.1 Process: View Video Trailers

Table 15: Process Description

Identifier	UC-6: View Video Trailers
Purpose	Allows user to view video trailers before buying the DVD
Requirements	WC_4193
Development Risks	None
Pre-conditions	None
Post-conditions	None

Table 16: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on Buy DVD tab	
2		System opens a page with DVD details and link to YouTube where user can preview the DVD before buying it.
3	User clicks on the link and view the trailer	

2.1.3.7 Capability: ecommerce Section

2.1.3.7.1 Process: Buy DVD

Table 15: Process Description

Identifier	UC-7: Buy DVD
Purpose	Allows user to buy DVD of events and Rehearsals
Requirements	WC_4193
Development Risks	COTS Integration of Squarespace and Stripe
Pre-conditions	None
Post-conditions	None

Table 16: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on Buy DVD tab	

2		System opens a page with DVD details and link to YouTube where user can preview the DVD before buying it.
3	User clicks on the link to view the trailer and click on Buy	
4	User makes the payment	
5		System sends the payment confirmation email to the User

2.1.3.8 Capability: Single Website

2.1.3.8.1 Process: View all content at Single website

Table 17: Process Description

Identifier	UC-8: View all content at single website
Purpose	Allows user to view all content at single website
Requirements	WC_4215
Development Risks	None
Pre-conditions	None
Post-conditions	None

Table 18: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User can view all the content at single website rather than using three website	

2.1.3.9 Capability: Contact Us

2.1.3.9.1 Process: Give Feedback

Table 19: Process Description

Identifier	UC-9: Give Feedback
Purpose	Allows user to give their feedback using Contact Us page of the website
Requirements	WC_4225
Development Risks	None
Pre-conditions	None
Post-conditions	Admin receives an email with user's feedback or enquiry

Table 20: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on Contact Us Page	
2		System opens the Contact Us Page.
3	User fills the Contact Us Form and clicks on submit	
4		System sends an email to the Admin with the feedback submitted by the user

2.1.3.10 Capability: Yearbook

2.1.3.10.1 Process: View Yearbook

Table 21: Process Description

Identifier	UC-10: View Yearbook
Purpose	Allows user to view the Yearbook on the VYMA website
Requirements	WC_4202
Development Risks	None
Pre-conditions	None
Post-conditions	None

Table 22: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on Yearbook tab	
2		System opens a page with a link to Yearbook
3	User clicks on the link and view the Yearbook	

2.1.3.11 Capability: Donation

2.1.3.11.1 Process: Make Donation

Table 23: Process Description

Identifier	UC-11: Make Donation
Purpose	Allows user to make donation to VYMA
Requirements	WC_4227
Development Risks	COTS Integration of Squarespace and Stripe
Pre-conditions	None

Post-conditions	None
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Table 24: Typical Course of Action

Seq#	Actor's Action	System's Response
1	User clicks on Donation Tab	
2		System opens a Donation page
3	User fills the form and make payment	
4		System sends payment conformation email to the user

2.1.4 Modes of Operation

The VYMA website will have only one mode so this section is not applicable.

2.2 System Analysis Rationale

VYMA website is used by either Parents or Students who are older than 18 years. This website does not require any login. But there are some features which are available to only Members (students who are registered to some course). These features include downloading Music Notes, view detailed event calendar. In order to use these features, members will be provided with password to view these password protected features as soon as they register for a course. Previously, members had to go to different website to use these features. Now, members needs to be informed by the admin that all the features are being provided at a single website.

3. Technology-Independent Model

Our project involved developing a website using Squarespace as specified by the client therefore we are omitting this section in the SSAD.

4. Technology-Specific System Design

4.1 Design Overview

4.1.1 System Structure

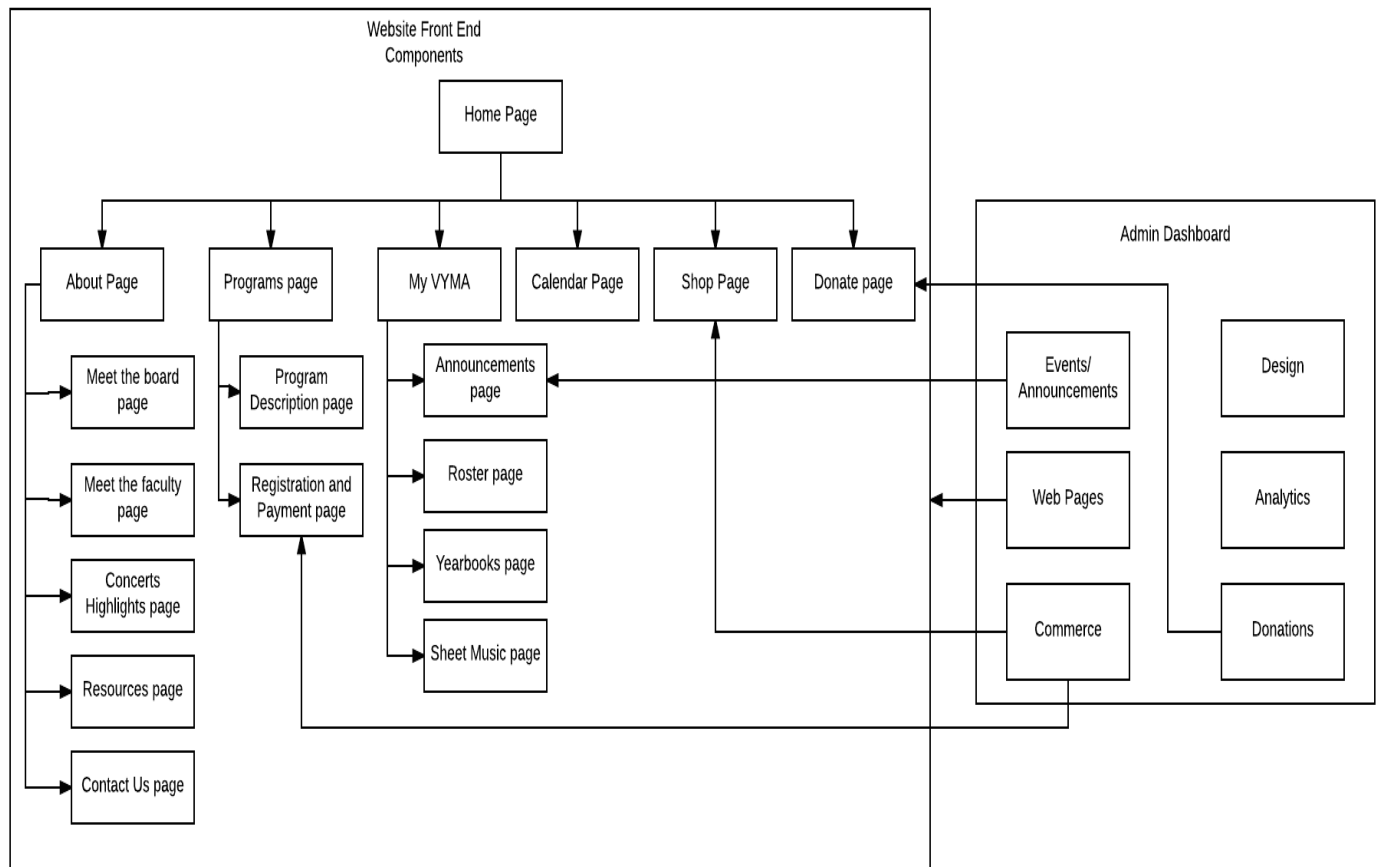
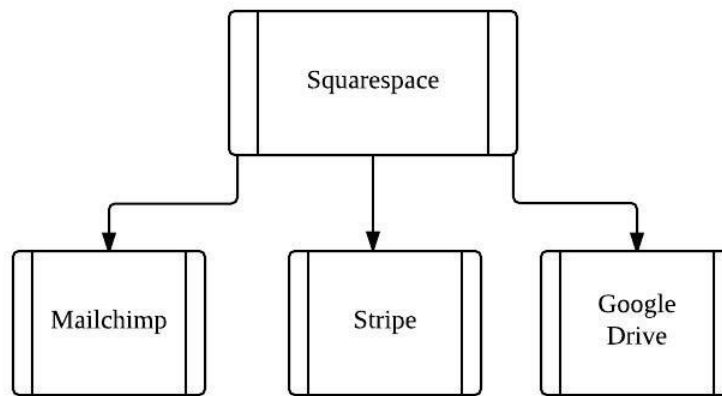


Figure 7: Software Component Class Diagram

**Figure 8: Supporting Software Component Class Diagram****Table25: Software Component Description**

Software Component	Description
Home Page	Page describing the mission, philosophy and VYMA's name along with the search functionality.
About Page	Page describing the history and foundation of VYMA.
Meet the board page	Page about the board members of VYMA
Meet the faculty page	Page with links to pages to the faculty members.
Faculty page	Page with the description about the faculty members for each instrument.
Concert highlights page	Page with photos and videos on the highlights of previous concerts.
Resources page	Page with contact details of resources for luthiers, online music stores, local music stores, and local concert series.
Contact Us page	Page with details on how to contact VYMA along with the contact form.
Programs Page	Page with all the list of courses offered by VYMA.
Program description page	Description of the course.
Registration and payment page	Page to enter the student details, register and make the payment.
Calendar Page	Page with the calendar of events. Can be viewed by everybody.
Sheet Music Page	Page with the links to pdfs of the music notes.
Events Page	Password protected page with the details of the events. Can be viewed only by the members.
Announcements Page	Password protected page with all the announcements that VYMA posts.

Roster page	Password protected page with the details of all the current members of VYMA.
Yearbooks page	Page with links to the yearbook on Shutterfly.
Shop page	Page to view trailers and purchase DVDs of the various concerts.
Donate page	Page to get information on the various ways one can help VYMA and to make monetary donations.
Admin Dashboard	Squarespace dashboard through which the admin can edit all the pages, add or remove content, update the content, add events, announcements, view page analytics and view the payment details.
Web Pages	Add new pages to the website from the admin dashboard
Commerce	Manage the transactions made from the website
Donations	Manage the donations made from the admin dashboard
Analytics	View the traffic overview and page hits from the admin dashboard
Design	Deals with the templates and design of the web pages from the admin dashboard

Table 26: Supporting Software Component Description

Support Software Component	Description
Mail chimp	Mail chimp is used to manage the subscribers of the newsletter and to trigger email notifications when any announcements are posted.
Stripe	Stripe is used for managing payments (payments for courses and donations).
Google Drive	Google drive is used to manage the registration and roster details.

4.1.2 Design Classes

4.1.2.1 Registration System

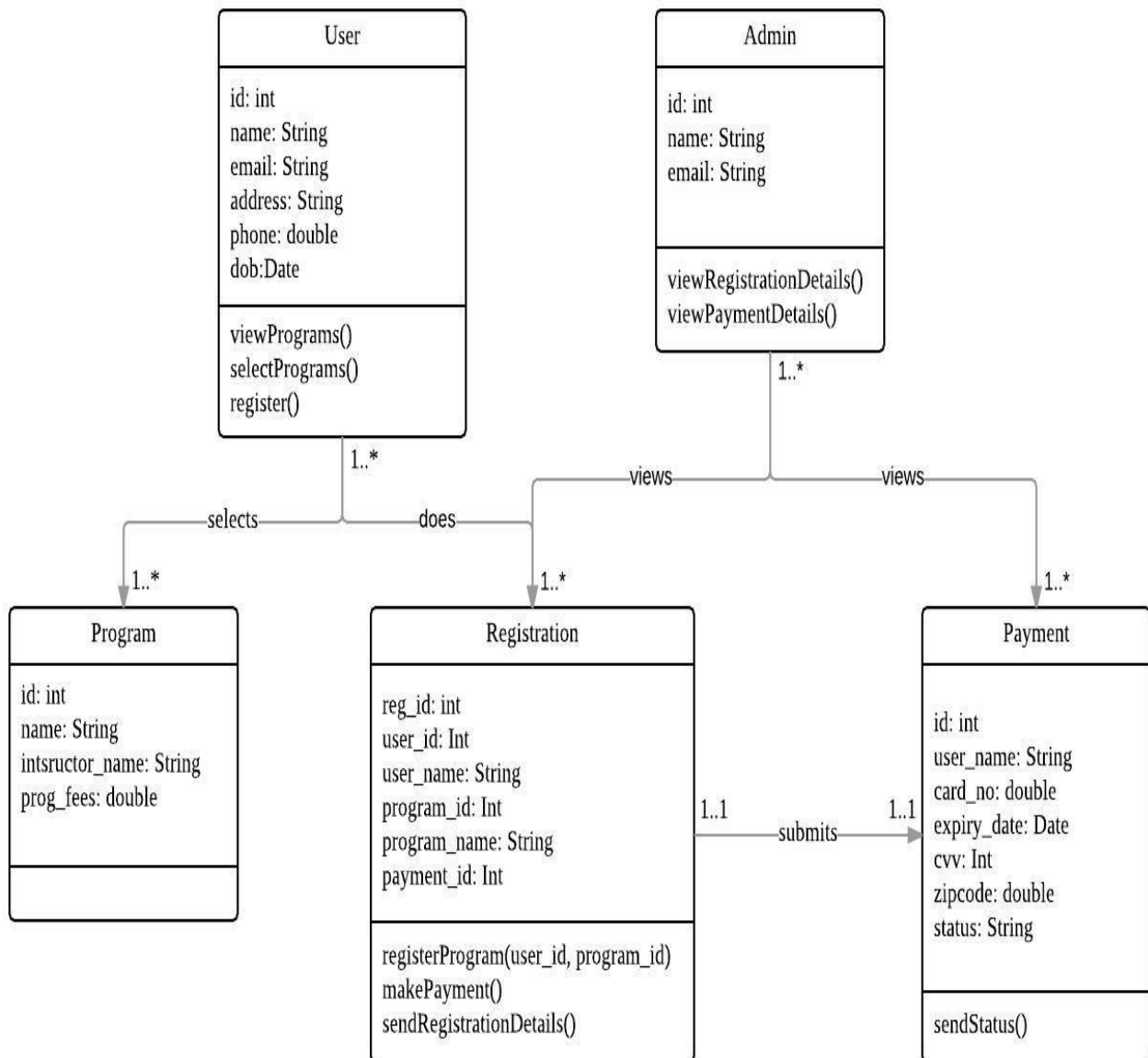


Figure 9: Design Class Diagram-Registration and Payment System

Table27: Design Class Description

Class	Type	Description
User	Entity	Anyone who uses the website(members and non-members)
Admin	Entity	The client and maintainers at VYMA who will make the changes via Squarespace's admin dashboard
Program	Entity	All the courses and programs offered by VYMA that the students can opt for.
Registration	Component	Register for various courses and programs offered by VYMA.
Payment	Component	Payment details and transactions for the various courses, DVD's and/or donations.

Announcement Section:

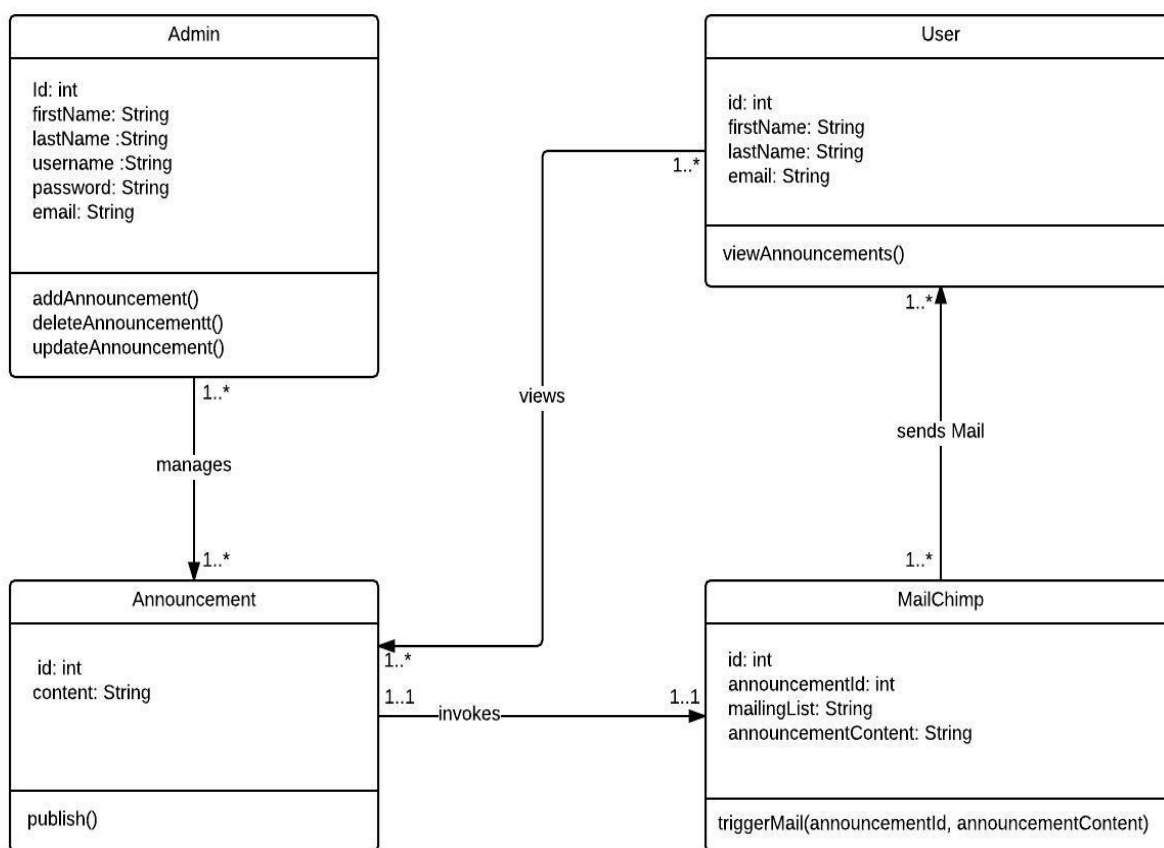


Figure 10: Design Class Diagram-Announcement System

Table28: Design Class Description-Announcement System

Class	Type	Description
User	Entity	Anyone who uses the website(members and non-members)
Admin	Entity	The client and maintainers at VYMA who will make the changes via Squarespace's admin dashboard
Announcement	Component	Announcement section contains various announcements about upcoming VYMA events.
MailChimp	Component	MailChimp is used to send email to Users whenever Admin updates the Announcement Section.

Remaining Sections

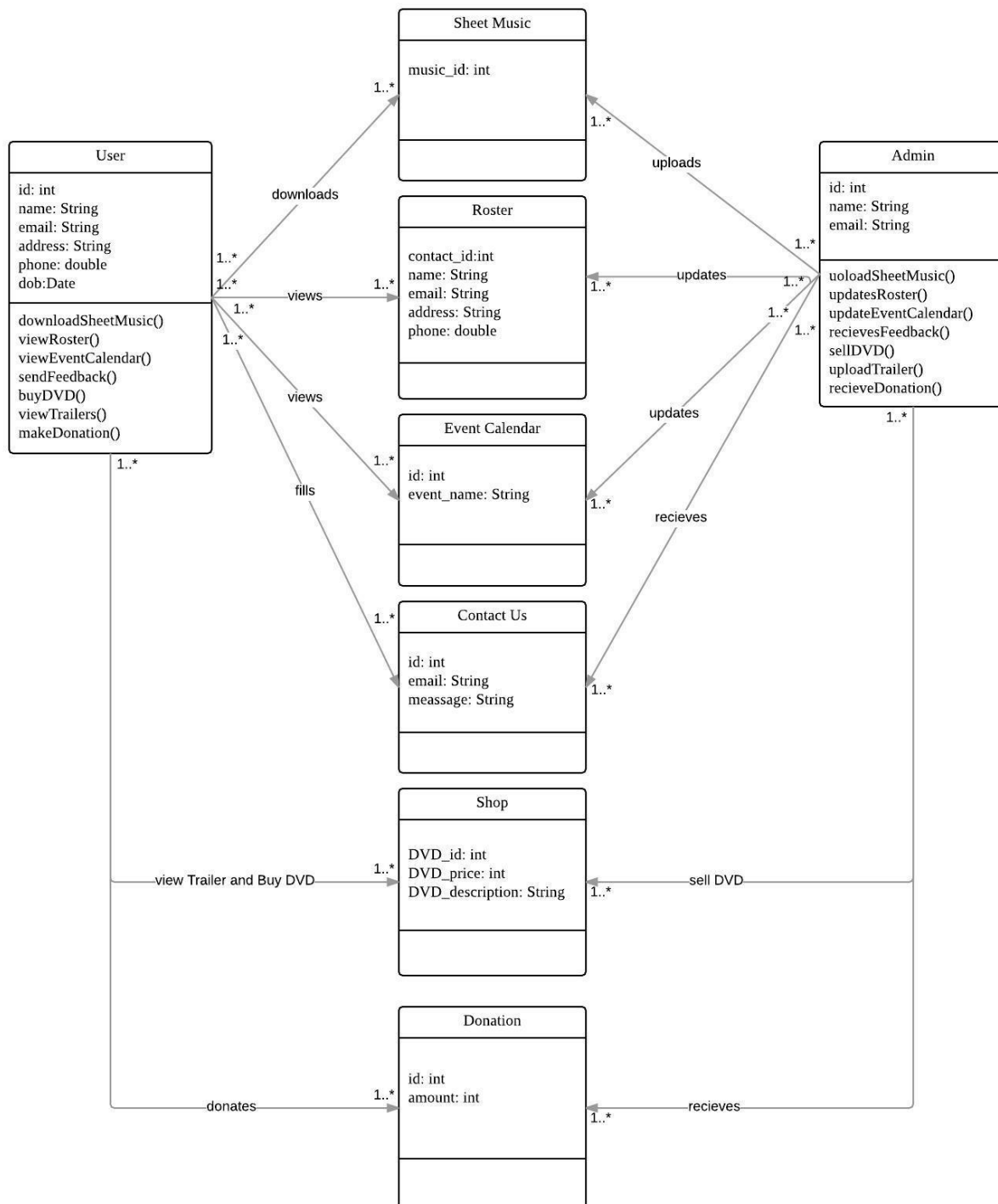


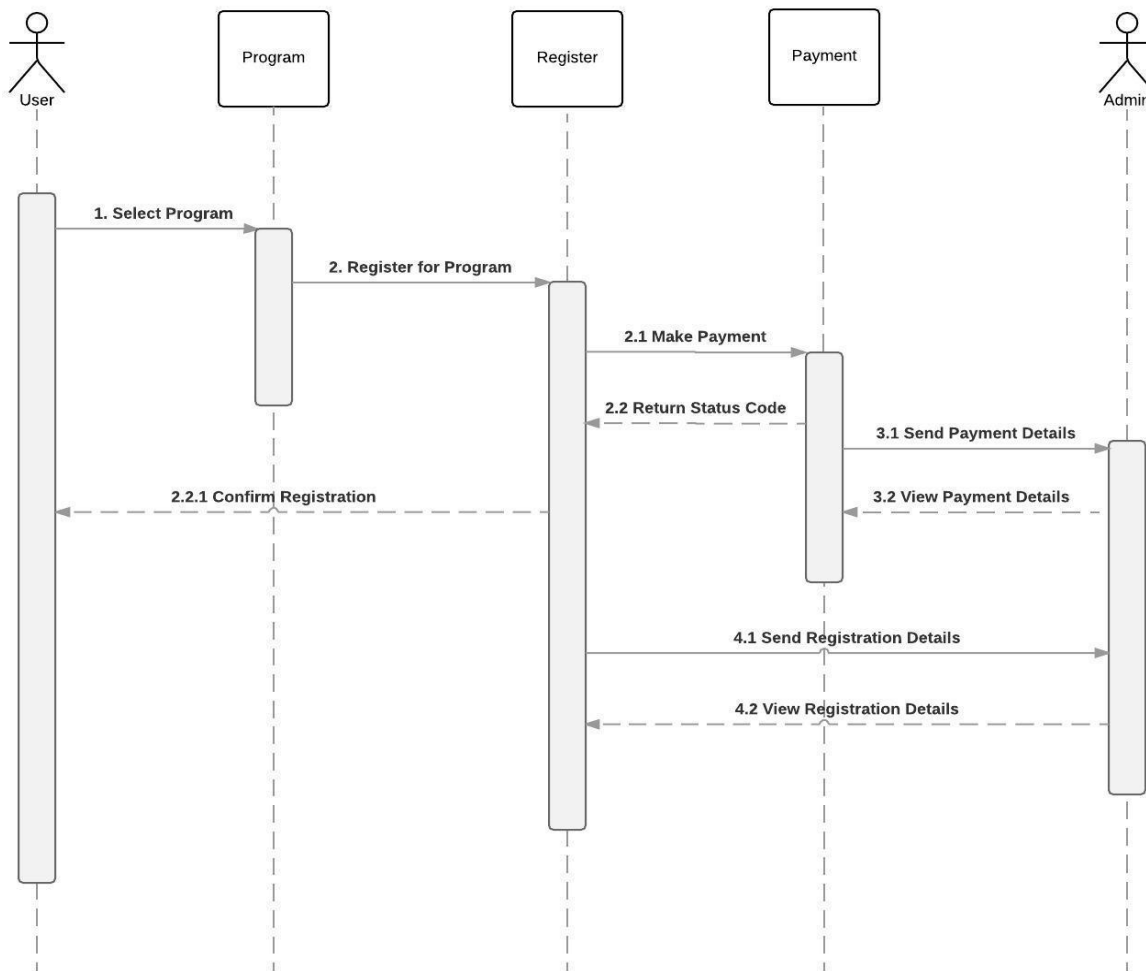
Figure 11: Design Class Diagram-Remaining System

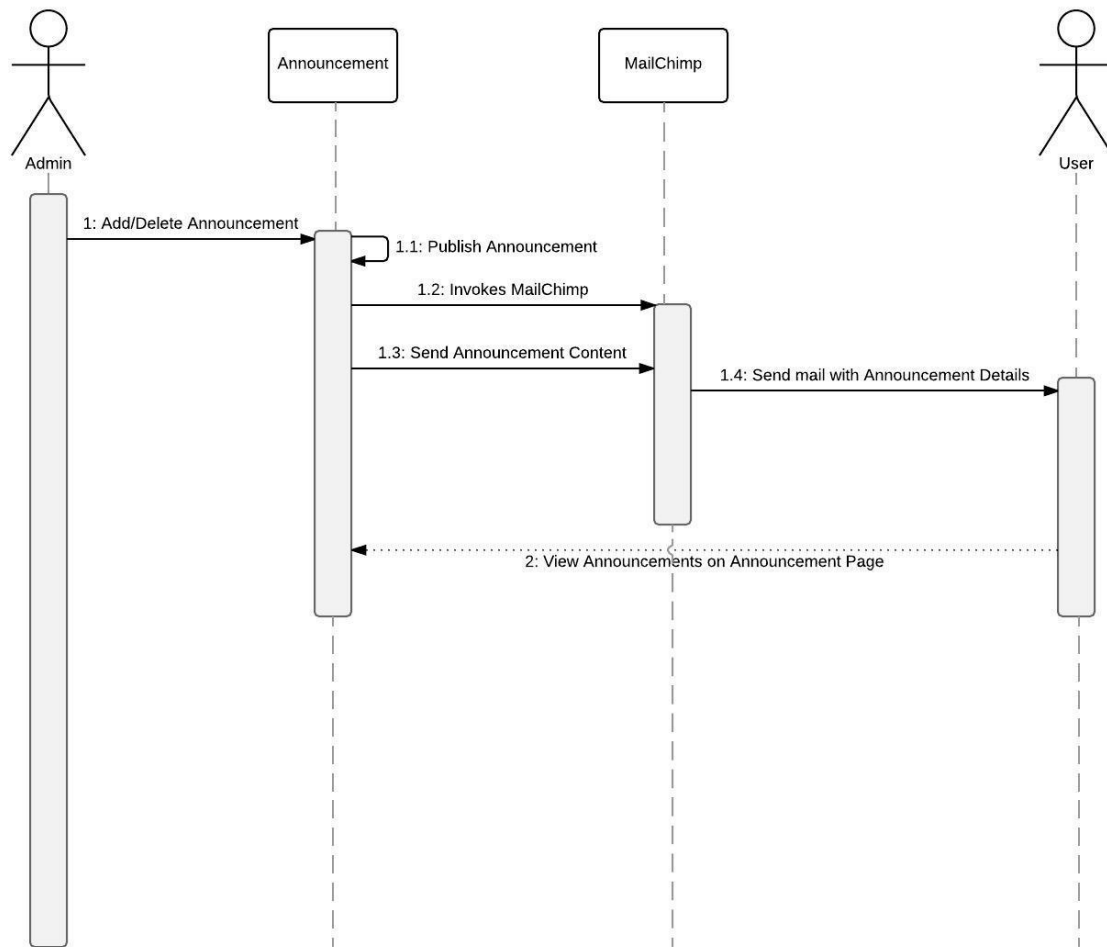
Table29: Design Class Description -**Remaining System**

User	Entity	Anyone who uses the website(members and non-members)
Admin	Entity	The client and maintainers at VYMA who will make the changes via Squarespace's admin dashboard
Sheet Music	Component	User downloads Sheet Music before every class to practice the music.
Roster	Component	Roster contains parent's details of all the students.
Event Calendar	Component	Event Calendar contains all the upcoming VYMA event and their details.
Contact Us	Component	User can contact VYMA through Contact Us forms to give their feedback
Shop	Component	User can view Trailers and Buy DVD of concerts.
Donation	Component	User can make donation to support VYMA

4.1.3 Process Realization

In this section, we have created sequence diagrams for the modules which were difficult to understand.

**Figure 12: Sequence Diagram: Online registration and Payment**

**Figure 13: Sequence Diagram: Announcements**

4.2 Design Rationale

Our client had shown interest in using Squarespace for the development of the website due to its user friendly features and 24*7 customer support service. Our team did a complete analysis and survey on the different options and decided that Squarespace indeed would be the best choice for this project.

WordPress and Wix were the other two options.

The following are the reasons behind choosing Squarespace:

- Templates are of better quality, responsive and mobile-compatible
- Opportunity for making changes to templates and website capabilities are provided via a developer platform tool
- No coding experience needed for adding functionalities from Squarespace official integrations. This was an important feature for maintenance purposes.
- All pricing plans offer hosting, maintenance and security
- 24/7 chat/email customer support
- The pricing plan was in accordance with the budget given to us by the client.

Mail Chimp is used because the client had been using it for managing the newsletters on their old system. Also, squarespace supports Mail Chimp as well. The new system uses Mail Chimp for maintaining the mailing lists for the newsletters and for sending out emails to the subscribed members whenever a new announcement is posted on the website.

Stripe was chosen for all the payment transactions due to its ease of use and integration with Squarespace.

5. Architectural Styles, Patterns and Frameworks

Name	Description	Benefits, Costs, and Limitations
Squarespace	Content Management System that provides website creation and customization tools (e.g. developer platform), hosting, and customer support.	<p>For \$18/month, Squarespace takes charge of all aspects of website creation while allowing some degree of customization: user-friendly templates website server maintenance, hosting and complete third party service integrations for supporting payments, marketing etc.</p> <p>Website customization is limited by what Squarespace provides support for and the features they offer. The set of features available will depend on the plan selected (which has cost implications).</p> <p>Squarespace does not make public implementation-specific details.</p>
Service-Oriented Architecture	Squarespace supports integration with other services, which are used for creating the VYMA website and support different features such as email newsletters and tuition payments.	<p>Limited availability of third-party services that are already fully compatible with Squarespace.</p> <p>Squarespace provides a developer platform for customizing code and potentially adding new functionality using other external services. It does not guarantee full compatibility.</p> <p>The developer platform is available with the purchase of Squarespace plan.</p>
Three- tier architecture	Squarespace has different modules for managing the website creation: user interface, data storage, and business logic.	<p>This architecture allows better data management, security and robustness.</p> <p>Each module could possibly be changed/updated without affecting any other module.</p> <p>Client cannot access database directly.</p> <p>Adds complexity to website development and maintenance.</p>

Table 30: Architectural Styles, Patterns, and Frameworks