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ONLINE ART GALLERY

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GRADUATE CAPSTONE SEMINAR PROJECT

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For the Degree of Master of Science,

With a Major in Computer Science

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ABSTRACT

Online Art Gallery is an e-commerce website, which allows people with art and artists all over the world to showcase a large selection of paintings, drawings, prints, digital art, sculpture and photography. This website also provides artists with a curated environment in which to exhibit and sell their work.

Online Art Gallery contains a database which stores artist, buyer, and gallery information. This website allows the artist and buyer the ability to browse for artwork by categories, subjects, artists, tags and prices. This website allows advanced searching where a potential buyer can search galleries based on specifics such as theme, author, date, size, price, or color. The buyer will also be sent to a booking form and payment process to finalize transactions. This website will also incorporate a user survey and comment form.

The Online Art Gallery will be created in the Microsoft Web Application Framework, ASP.NET. The Front-end of the website will be created in HTML5, CSS3, and Bootstrap. The Backend of the website will incorporate C-Sharp and SQL Server 2017 to process and store user input respectively. Microsoft Visual Studio 2017 and Microsoft SQL Server Management Studio 2017 will be used as the Integrated Development Environments to create the website and its database.

Modules:

1. Home module.
2. User Registration module.
3. Login module.
4. Admin module.
5. Sell Art module.
6. My Art module.
7. Cart module
8. Order history module

Table of Contents

1 Description 1
1.1 Competitive Information 2
1.2 Relationship to Other Applications/Projects 2
1.3 Assumptions and Dependencies 2
1.4 Future Enhancements 2
1.5 Definitions and Acronyms 2
2 Technical Description 3
2.1 Application Architecture 8
2.2 Application Information flows 9
2.3 Interactions with other Projects (if Any) 11
2.4 Interactions with other Applications 11
2.5 Capabilities 11
2.6 Risk Assessment and Management 11
3 Project Requirements 11
3.1 Identification of Requirements 12
3.2 Operations, Administration, Maintenance and Provisioning (OAM&P) 13
3.3 Security and Fraud Prevention 13
3.4 Release and Transition Plan 14
4 Project Design Description 14
5 Internal/external Interface Impacts and Specification 16
6 Design Units Impacts 16
6.1 Functional Area/Design Unit 17
6.1.1 Functional Overview 17
6.1.2 Impacts 17
6.1.3 Requirements 17
7 Open Issues 18
8 Acknowledgements 18
9 References 18
10 Appendices 20

1 Description

The purpose of the Online Art Gallery is to allow prospective customers the ability to sell and purchase Art. The Online Art Gallery also contains special functionality that is not viewed in many other Art Gallery websites. The ability to extract a color specific to the pixels of the image uploaded by the customer. Once the color is determined via a pixel sorting algorithm, a string representation of the color is submitted to the database allowing the customer the ability to search for a specific type of Artwork based on the color they typed. The Online Art Gallery is also object oriented allowing streamlined data flow between the User Interface Layer, Business Logic Layer, and Data Access Layer. Permissions are also enforced for security purposes with the Online Art Gallery consisting of three main users which are gallery, seller and buyer. Gallery serves as an administrator of the website and can manage sellers, buyers, and transactions. The gallery user will have all the authority to manage the transations and track the transactions of the seller and buyer. The gallery user can also add and delete the seller and buyer. Additionally specifc security protocols are set in place for specific functions within the application for secure data flow of sensitive information provided by the customer. Sellers and buyers can sell and buy Artwork respectively.

Role of user:

- Online Art Gallery is an online application that displays and sells Artwork.
- The Artist can register online and be a member of the Online Art Gallery. Each artist can upload a digital copy of their Artwork.
- The Artist can host their artwork for sale in the website.
- Art lovers can go online to view and purchase their favorite Artwork.

Modules:

1. Home module.
2. User Registration module.
3. Login module.
4. Admin module.
5. Sell Art module.
6. My Art module.
7. Order History module
8. Transaction Module
9. Cart Module
10. Art Details Module
11. Survey Module

The Home page will have the following pages: The home page is the page which provides an overview of the website.

- Registration Page: The registration page will allow the buyer and seller to create an account in order to buy or sell Artwork.
- Login Page: The login page will allow the buyer or seller to login with their email and password (username and password).
- Sell Art Page: The seller can upload or store the paintings and arts.

- Home Page: Buyers can view, and search Artwork based on the Art Name, Artist Name, Color of the Artwork, Categories, Description, Date, and Price.

The sub modules after the user has logged in will have the following pages:

- Art Details: Allows the user to view a detailed version of the Artwork with the ability to purchase the artwork.
- Order History page: Allows the user to view orders placed sortable based on the date
- My Art Page: Allows the user to modify or delete their uploaded Artwork.
- Cart Page: Allows the user to save items that will be purchased and allow them to purchase their items.
- Order History Page: Allows the user to view their placed orders based on date and price
- Transaction Page: Allows the user to securely enter Transaction information such as their credit card information.
- Survey Page: Allows the user to enter a rating or comment based on their purchasing experience. Essentially this is a comment form.

1.1 Competitive Information

The Online Art Gallery will compete against the following applications: Artpal and singular. Both competitors actively sell art in a professional manner and capability, however, the Online Art Gallery has the potential to be the first to market the ability to search by color via a search textbox determined by the extracted pixel value of the uploaded Artwork.

1.2 Relationship to Other Applications/Projects

The Online Art Gallery brings the user an opportunity to view and purchase Artwork. There are many websites that showcase Artwork for viewing and purchasing purposes which the Online Art Gallery successfully manages to do.

1.3 Assumptions and Dependencies

- Assumptions are given that the details of the art gallery are all correct.
- Assumptions are given that customer can get information regarding gallery.
- Assumptions are made that the website will be available 24hrs a day.
- Assumptions are made that admin will keep track of the records of the art sold.
- Assumptions made that that user can sell his arts in sell art page.
- We assume that each art is loaded in the website has valid information and details of seller.
- We assume that the seller and buyer are genuine and valid.

1.4 Future Enhancements

Provide more advanced security features such as PayPal and cash transactions to the website and more advanced features to manage the color of uploaded images. The ability to allow a user to provide a rating to the Online Art Gallery website overall.

1.5 Definitions and Acronyms

.Net: Microsoft web application Framework
HTML: Hyper Text Markup Language
CSS: Cascading Style Sheet
Microsoft SQL: Microsoft Structured Query Language
MS VS: Microsoft Visual Studio

SSMS: Microsoft SQL Server Management Studio
JavaScript: Scripting Language (Delamater & Boehm, 2016)

2 Technical Description

The Online Art Gallery utilizes ASP.Net Webforms with individual accounts for authentication and authorization purposes. The Identity Framework is utilized within the Online Art Gallery providing the creation and management of users and their respective accounts (2016). Users can be securely created and maintained due to the security features that the Identity Framework and Owin provide via unique identifiers, roles, and hash-based passwords. Transport Layer Security (TLS) is enabled within the Online Art Gallery to enable Hyper Text Transfer Protocol (HTTPS) to securely process sensitive user payment information.

The Online Art Gallery also incorporates the use of permission or role-based access in order to securely register and access pages according to the user's purpose of interacting with the website such as business purpose or administration (Duckett, 2011). Client-side and Server-Side validation is incorporated into the Online Art Gallery. Client and Server-side validation for the Online Art Gallery consists of but not limited to Range Checking, SQL Command Parameter checking, Data type checking, File Upload checking, and permissions review. Javascript, Jquery, and Bootstrap are utilized within all Webforms to provide a friendly and unique user design and experience.

The ObjectDataSource control is enabled within the Online Art Gallery allowing it to retain a three-tier architecture. Specific objects that enable the ability to Retrieve, Add, Modify, or Delete data are in the Models folder within the root directory of the Application. The MDF file which is used as the primary means of storing and retrieving data is in the App_Data folder and its label ArtGalleryDB is the name of the connection string used to allow communication with the application. The MDF File can also be imported to Microsoft SQL Server 2017 for maintenance or modification purposes.

Images that are uploaded by the user are stored within a folder titled 'Images' where the file path of the image appended with its file name is stored within its respective table in Microsoft SQL Server 2017. For the image to be displayed within the Art Gallery, the path of the file is called displaying the image without the need for intensive processing power resulting from image serialization and deserialization.

The Online Art Gallery contains functionality that provides the ability to determine an uploaded Image's color based on the pixel values extracted from the image itself. When the image is uploaded, the image is copied into the Image's folder before being converted into a Bitmap file format. The Bitmap of the image is passed into a function titled AverageColor. AverageColor determines the average pixel value that pertains to the Red, Green, and Blue colors by performing multiple calculations utilizing the Bitmap's width and value height via a For loop where they are stored and returned as a list. The values of the list are passed into another function titled ExtractedColorsValue where further calculations are performed. The refined RGB values are extracted from the ExtractedColorsValue and sent to a function titled FindColorName where the color name is determined based on the numerical range the separate values correspond to. The highest value according to the specified ranges within the function will return the string representation of that color. The string representation of that color is returned and submitted to the

database according to the image it came from. The possible colors that can be returned are Black, White, Grey, Red, Pink, Yellow, and Brown, Green, Blue, and Pink.

Ultimately the Online Art Gallery can be run locally for testing purposes via Internet Information Services (IIS) with either the utilization of Microsoft Internet Explorer, Google Chrome, or Mozilla Fire Fox. It is recommended for production purposes that the Online Art Gallery be run in either a Microsoft vetted webserver or Microsoft Azure for easier scalability and security.

In the illustration below, Figure 1 represents an Entity Relationship diagram, which is used to shows links between the entities and the kind of relation between them. We are not talking about tables or keys in ER diagram. Usually the ER diagram follows the merise model. As developers, we usually build the ER model before going into relational diagram. The diagram shown below represents how the entities are being linked to each other and what is their relationship, the different entities like art, survey, user claims, cart, user login, user, login, system diagram and migration.

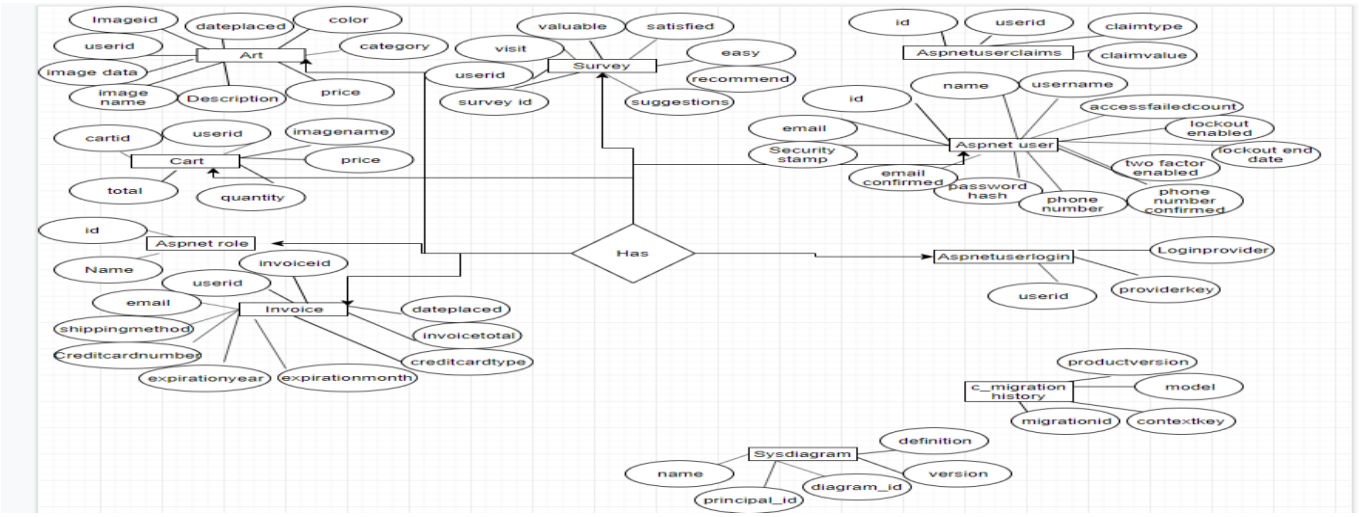


Figure 1: ER Diagram

Figure 2 represents Entity Relationship Database Schema Diagram shown below. It is an all-encompassing term that refers to the collective of tables, columns, triggers, relationships, key constraints, functions and procedures (Oura, Kobayashi, & Shirasaka, 2019). We will be able to insert data into the existing schema.

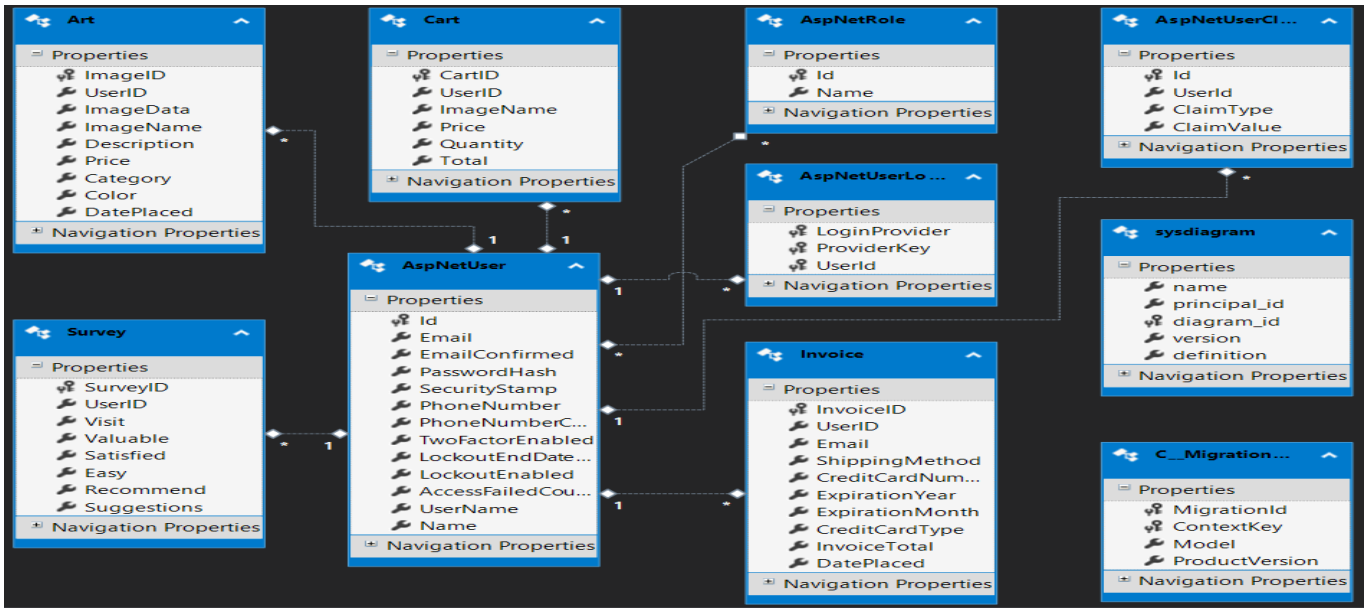


Figure 2: Relationship between Tables

Online Art Gallery consists of one database which is ArtGalleryDB. The database schema consists of ten tables. They have specific operations enabled to allow them to update or delete information and store the data based on the user needs. Each table will store information based on the operation performed on the web application.

We have designed a relational model ER schema for keeping track of information about all users as the following:

- **Relation between AspNetUserClaims and AspNetUsers Tables**

Table Name: AspNetUserClaims
Primary key: Id
Foreign Key: UserId
Relationship: M:1

AspNetUserClaims Table

Id	UserId	ClaimType	ClaimValue

Table Name: AspNetUsers
Primary key: Id
Relationship: 1:M

AspNetUsers Table

Id	Email	UserName	Name

"Each Online Art Gallery user can have one or more claims, but each claim must be referred to one user."

- **Relation between AspNetUserLogin and AspNetUsers Tables**

Table Name: AspNetUserLogin
Primary key: LoginProvider, ProviderKey, UserId
Foreign Key: UserId
Relationship: M:1

AspNetUserLogin

LoginProvider	ProviderKey	UserId

Table Name: AspNetUsers
Primary key: Id
Relationship: 1:M

AspNetUsers Table

Id	Email	UserName	Name

"Each Online Art Gallery user can have one or more user login provider, but each login provider must be referred to one user."

- **Relation between AspNetUsers and AspNetRole Tables**

Table Name: AspNetUsers
Primary key: Id
Relationship: M:M

AspNetUsers

Id	Email	UserName	Name

Table Name: AspNetRole
Primary key: Id
Relationship: M:M

AspNetRole

Id	Name

"Online Art Gallery user could have more than one role, and each role could refer to more than one user. For example: Admin is a user. Admin can be a seller, buyer, and an admin. Also, one user can be a buyer and a seller."

- **Relation between AspNetUsers and Art Tables**

Table Name: AspNetUsers
Primary key: Id
Relationship: 1:M

AspNetUsers Table

Id	Email	UserName	Name

Table Name: Art
Primary key: ImageID

Foreign Key: UserId
Relationship: M:1

Art Table

ImageID	UserID	ImageData	ImageName	Description	Price	Category	Color	DatePlaced

"Each Online Art Gallery user (seller) can have (sell) one or more piece of art, but each piece of art must be referred to user (seller)."

- **Relation between AspNetUsers and Cart Tables**

Table Name: AspNetUsers
Primary key: Id
Relationship: 1:M

AspNetUsers Table

Id	Email	UserName	Name

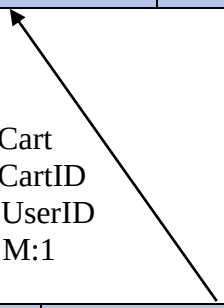


Table Name: Cart
Primary key: CartID
Foreign Key: UserID
Relationship: M:1

Cart Table

CartID	UserID	ImageName	Price	Quantity	Total

"Each Online Art Gallery user (buyer) can have one or more piece of art in the cart, but each piece of art in the cart must be referred to user (buyer)."

- **Relation between AspNetUsers and Invoice Tables**

Table Name: AspNetUsers
Primary key: Id
Relationship: 1:M

AspNetUsers Table

Id	Email	UserName	Name

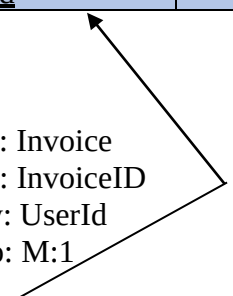


Table Name: Invoice
Primary key: InvoiceID
Foreign Key: UserId
Relationship: M:1

Invoice Table

Invoic	User	Em	Shipping	CreditCard	Expiratio	Expiration	CreditCar	Invoice	DatePl

eID	ID	ail	Method	Number	nYear	Month	dType	Total	aced

"Each Online Art Gallery user (buyer) can have one or more invoice, but each invoice must be referred to user (buyer)."

- **Relation between AspNetUsers and Survey Tables**

Table Name: AspNetUsers
Primary key: Id
Relationship: 1:M

AspNetUsers Table

Id	Email	UserName	Name

Table Name: Survey
Primary key: SurveyID
Foreign Key: UserId
Relationship: M:1

Survey Table

SurveyID	UserID	Visit	Valuable	Satisfied	Easy	Recommend	Suggestions

"Each Online Art Gallery user (buyer) can have one or more survey, but each survey must be referred to user (buyer)."

2.1 Application Architecture

One tier architecture is also known as the single tier architecture. All the required components for a technology are all arranged on one server by one tier architecture.

One tier design has all the layers like Presentation, Business and information Access layers in an exceedingly single computer code package. This is a good way to test your application in development environments and it is an ideal solution for small sites with low traffic demand which require effective resource utilization. It is handy to manage and maintain.

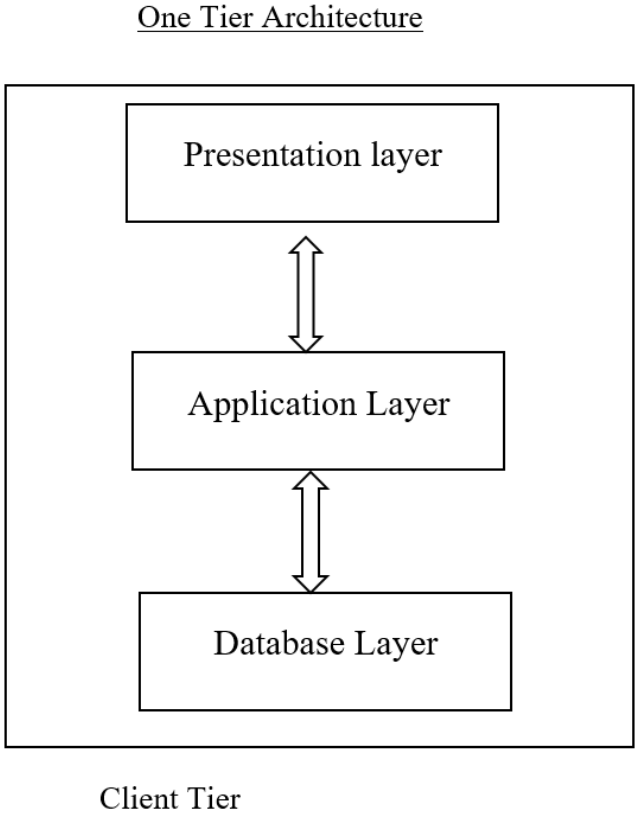


Figure 3: Architecture

There are three layers in the figure which are the presentation layer, application layer, and database layer. The presentation layer is the client layer which allows access to the web pages using this layer.

Presentation layer is also known as the client layer. By using this layer, we can access the webpages. The main practicality of this layer is to speak with Application layer.

Application layer is additionally called Business Logic Layer that is additionally called logical layer. Application layer interacts with information layer and sends needed data to the Presentation layer.

The data is stored in this database layer. Application layer communicates with information layer to retrieve the info. It contains methods that connects the database and performs required action

2.2 Application Information flows

Dataflow diagram is the starting point of the design phase of functionality that decomposes the requirements specification. A DFD consists of a series of bubbles joined by lines. The bubbles represent data transformation and the lines represent dataflows in the system. A DFS is a graphical representation of the flow of data through an information system. DFS's can also be used for the visualization of data processing. A DFD is a modeling technique for analyzing and constructing information processes.

In figure 4, we will see how the data flows from different processes. We can consider three processes like artist, member, administrator and the source as the database. The Art Gallery is the website which is connected to the database to store and retrive information. The artist acts like a seller who can sell their art by loading the images into the databse by utilizing the website. Members act as registered users or buyers who can buy artwork from the website by retrieving the images stored in the database. The Administrator

is responsible for control over the seller and buyer. The administrator can also add or remove the seller. The administrator also has the authority to interact with the database through the website as their primary interface. If the administrator wants to get the order details of a user he can login as an administrator and get the details. The administrator also has additional features to sell or buy artwork.

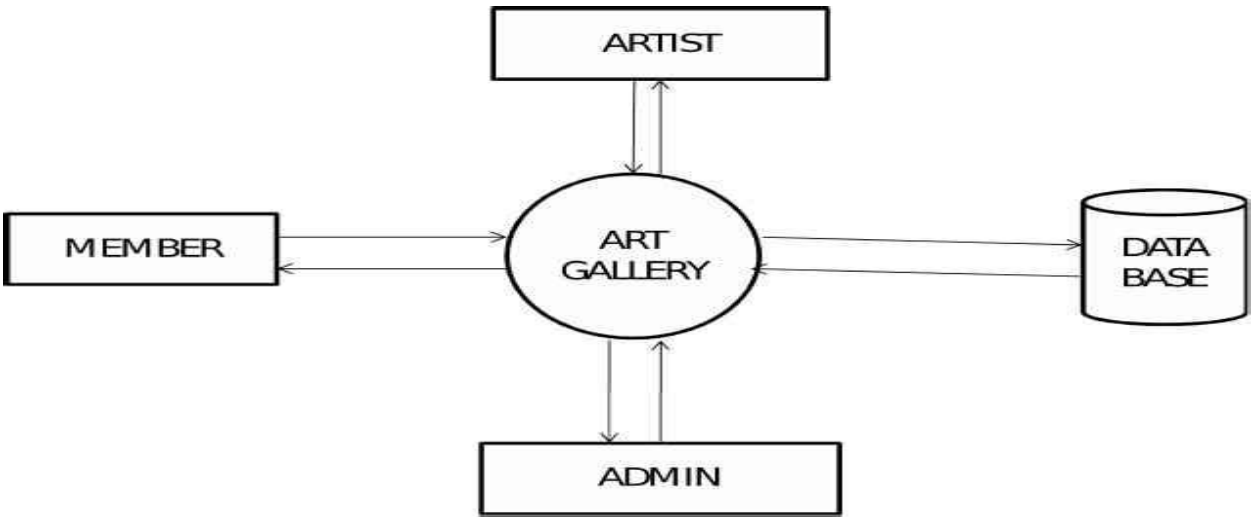


Figure 4: Admin Workflow

Figure 5 illustrates the artist workflow which represents the artist action steps of going to the website and viewing the images or artwork on the home page. The artist is restricted to login unless he has the login credentials or once he registers with the website. After succesful registration, the artist can login to the webpage and has option to change the password if required. The database will be able to store the login details and registration details. The artist can view the gallery, get the profile or search by color, artist and take action to upload the artwork or paintings to sell for a price.

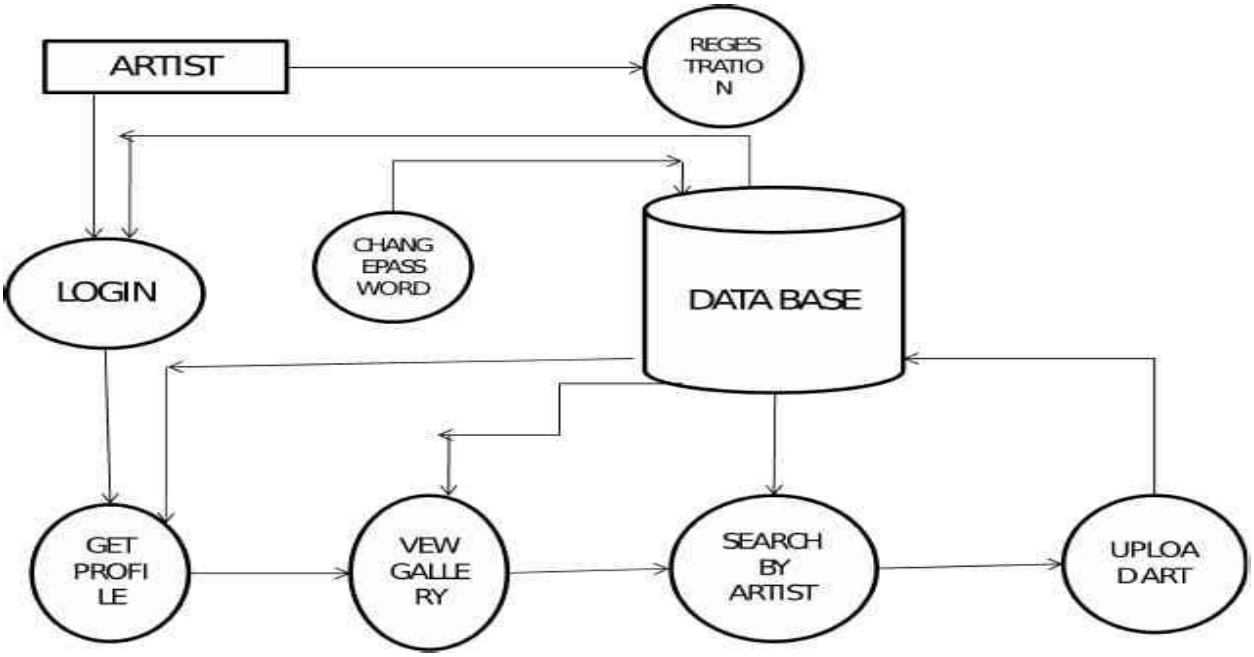


Figure 5: Artist Workflow

2.2.1 Buyer: A Buyer can view the list of paintings and can add to the cart to buy on the website. The buyer can purchase Artwork. Buyers can add or cancel the order they placed at any time.

2.2.1 Seller: A Seller can upload Artwork for purchase. Seller can view the order details by going to order history page. Seller can upload or edit or remove the image anytime.

2.2.3 Admin: An Admin can add, modify, or delete users.

2.3 Interactions with other Projects (if Any)

There are no interactions with other Projects.

2.4 Interactions with other Applications

There are no interactions with other applications.

2.5 Capabilities

Capabilities of Admin:

- View both Seller and Buyer details
- Add, modify, or remove users

Capabilities of Seller:

- Add, remove, or update Artwork
- Sell Artwork

Capabilities of Buyer:

- View orders
- View payment details
- View and Purchase Artwork

2.6 Risk Assessment and Management

When we implement the application, we come across many risks. Most risks are analyzed and identified. The responsibility of the admin is to reduce the risks after identification. The Buyer and the seller should not face any type of risks, if they feel that it is risky to use the application then the website will be in great loss. To avoid that, we imbedded Access Control Lists, Permissions, and Roles into the application which secures the website for authorization and authentication purposes. Security needs to be highly provided for the buyer and seller as they authenticate and process confidential information within the application. Therefore, to eliminate those types of risk, we are providing the most secured protocol system TLS via HTTPS to process transaction or payment details. The Identity Framework is also implemented and allows user security to be integrated into the Online Art Gallery reducing the attack surface of the application for user activity.

3 Project Requirements

In order to create or develop a website we come across many things mentioned below:

- We have chosen a domain name Online Art Gallery.com/.net
- Web technologies: HTML5, CSS, Bootstrap
  Scripting languages: Javascript, Jquery

Database: MS SQL

Framework: .Net

- This is an e-commerce website
- Clear flowchart is needed
- UML diagrams are needed
- Information to be provided is clear and understandable.
- Simple and attractive design is needed
- Colors to be used for buttons
- When we upload any image then it will impact everyone
- Website must be kept up to date and maintained well
- We need to have integration to social media for easy sharing
- Seller/buyer need to register to interact with website
- Identity Framework is utilized when the user registers the information.

3.1 Identification of Requirements

<Online Art Gallery Portal_SP- 2019 Homepage>

Online Art Gallery page where the seller/buyer can find their logins/register.

<Online Art Gallery Portal_SP- 2019 Buyerlogin>

User login page. User who is already registered can login to the page by giving the credentials like email and password

<Online Art Gallery Portal_SP- 2019 Sellerlogin>

This is seller login page where seller can login and upload the paintings to sell.

<Online Art Gallery Portal_SP- 2019 seller/buyer registration>

This is registration page where the new seller or buyer can register by giving their personal information like email, password, confirm password, roles.

<Online Art Gallery Portal_SP- 2019 seller/buyer registration>Functional Requirement)

Buyer can search for different paintings in the website.

< Online Art Gallery Portal_SP- 2019 Types>

Paintings available based on types or category.

<Online Art Gallery Portal_SP- 2019 Single art>

Buyer can select one art at a time and check the details about price, name of art, description of art.

<Online Art Gallery Portal_SP- 2019 Payment>

Buyer can order the art by paying here.

<Online Art Gallery Portal_SP- 2019 Admin/buyer>

Admin can delete or add the buyer and can check the order history, amount for single art, who has designed the art.

<Online Art Gallery Portal_SP- 2019 Admin/Seller>

Admin can check the seller information that is uploading the images or paintings.

<Online Art Gallery Portal_SP- 2019 Admin/Change Password> (Functional Requirement)

Admin can change the password.

<Online Art Gallery Portal_SP- 2019 Seller/add image> (Functional Requirement)

Seller can upload the image to webpage

<Online Art Gallery Portal_SP- 2019 Seller/view image> (Functional Requirement)

Seller can view the uploaded image.

<Online Art Gallery Portal_SP- 2019 Seller/order History> (Functional Requirement)

Seller can check the order history here

<Online Art Gallery Portal_SP- 2019 Seller/Payment Details>

Seller can look for the payment details.

<Online Art Gallery Portal_SP- 2019 Seller/ myart> (Functional Requirement)

Seller can look at my art history

<Online Art Gallery Portal_SP- 2019 Seller/change password> (Functional Requirement)

Seller can change password

3.2 Operations, Administration, Maintenance and Provisioning (OAM&P)

Routine Maintenance must be performed weekly by providing data cleansing of outdated images or inactive users determined by absent user activity. Data recovery, Fault tolerance, and backup must be implemented via Microsoft Azure as it provides quick recovery of business operations and reduces physical tampering of data. Backups must occur weekly to preserve data and be readily available in the instance of a disaster either virtual or physical. Vulnerability scanning must also be performed during low peaks hours, usually the weekend or Sunday night weekly, via Nessus or Qualys if possible, to identify and remediate application vulnerabilities such as outdated packages, scripts, and deprecated code in general.

3.3 Security and Fraud Prevention

The Identity Framework is utilized in the Online Art Gallery to support user interface (UI) login functionality. Users can create an account with the login information stored in Identity or they can use an external login provider. Passwords are stored in a hashed format within the database to prevent credential misuse and to defend against the instance that data a breach occurs, credentials are not able to be read in

plain text. Supported external login providers include Facebook, Google, Microsoft Account, and Twitter. There are also built in security features to protect against Cross Site Request Forgery (XSRF) attacks. The Admin also has the authority to verify the seller, buyer, payment, and order history details as well. TLS via HTTPs is enabled to encrypt information in transit via the Transaction Page in order to prevent Man In The Middle Attacks or packet sniffing of sensitive information. There are multiple configurations within the Online Art Gallery that prevents access to certain areas of the website. These areas are restricted and only accessible to the Administrator via permissions or Access Control Lists. Users must choose their roles which will affect their access to the website. The admin role is not available to any public facing user within the website. The Online Art Gallery utilizes SQL Command Parameters and validation of user controls to prevent cross site scripting, SQL Injection, and URL Redirects.

3.4 Release and Transition Plan

The Online Art Gallery will be deployed to potential customers via Microsoft Azure. Azure is a cloud platform that will provide enterprise scalability, Security, and Flexibility for customers around the world to utilize the Online Art Gallery. With the utilization of Resource groups and containers for on demand features, maintenance and modification will be inexpensive catering to both business and customer needs.

4 Project Design Description

- User Registration: The registration page will allow the buyer and seller to create an account in order to buy or sell Artwork.
- Login: The login page will allow the buyer or seller to login with their email and password. Another web page (user page) will open where the registered user can view their order, update their profile, access their checkout, and remove saved items.
- Gallery: The Art Gallery allows the user to view and purchase online Artwork. The Art gallery contains information about the Artwork such as the name, price, and description. The user can also search for Artwork based on the Art Name, Artist Name, Price, Description, Color of the Artwork, and Category via textbox. The user can also click on the Art Image which will allow them to view the Artwork in its entirety with the ability to also purchase the Artwork by adding to the cart.
- Seller's Page: Allows the seller to upload their Artwork by importing an image, setting a price, description, name of the art, and category.
- Buyer: The Buy art page allows a buyer to purchase Artwork based on browsing (selecting) by categories and other options mentioned above.
- My Art Page: Allows the artist to modify their uploaded Artwork. The user also can delete their Artwork from the Online Art Gallery.
- Cart Page: Allows the user to save items that will be purchased and allow them to purchase their items.
- Order History Page: Allows the user to view their placed orders based on date and price
- Transaction Page: Allows the user to securely enter Transaction information such as their credit card information.
- Survey Page: Allows the user to enter a rating or comment based on their purchasing experience. Essentially this is a comment form.

We have come across different types of charts but the use case diagram can identify users of a framework. The use case diagram will be able to show various ways a user can be collaborate with the system.

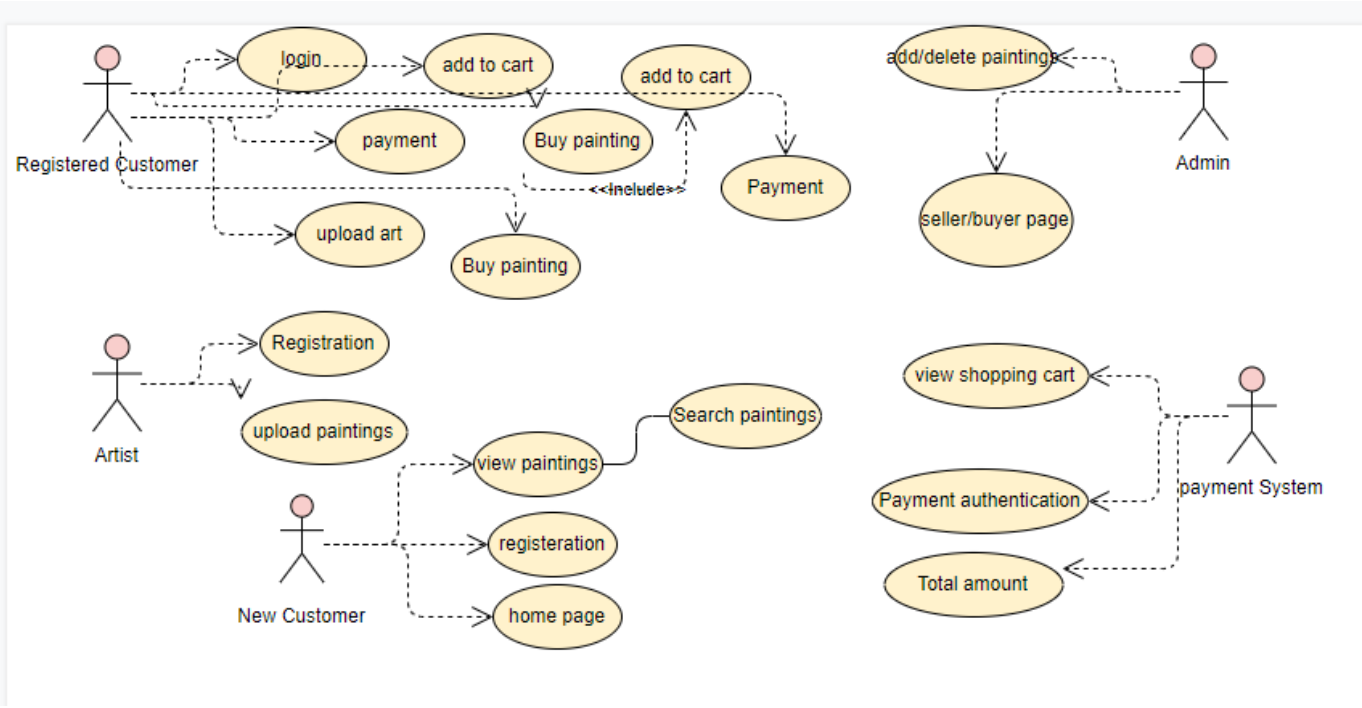


Figure 6: use case diagram

The above figure 6 represents the use case diagram of the project and the roles of the user. Seller and buyer can be divided based on the criteria. The above figure shows the three modules combined into one use case diagram and this case diagram shows how the step by step process is performed by the artist, admin, and buyer when they use the website.

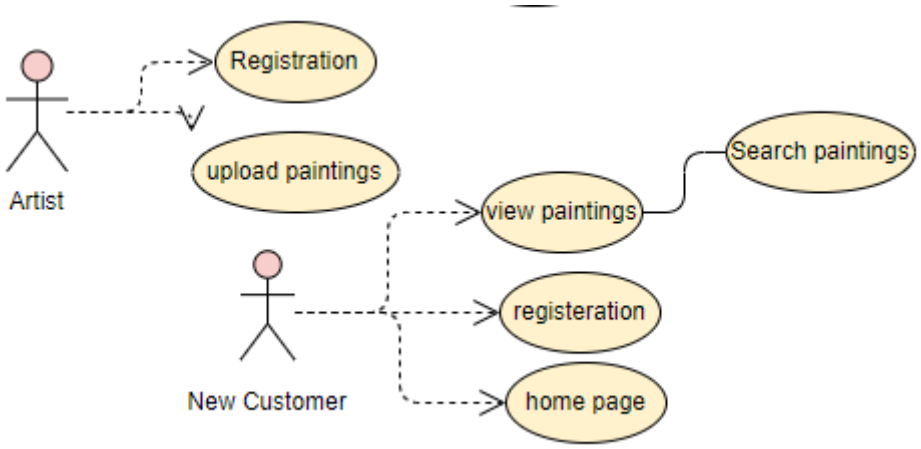


Figure 7: Seller case diagram

As described in Figure 7, the artist or seller will be able to create their own credentials by registering, once registered they will be able to login with email and password. Seller have to go to sell art page and try to enter the details like name of art, description, amount to sell, category(painting, Picasso, blue), upload image by clicking browse button and then click on register button to get the image uploaded in the webpage. Seller has an additional option to edit the image or painting anytime about painting details.

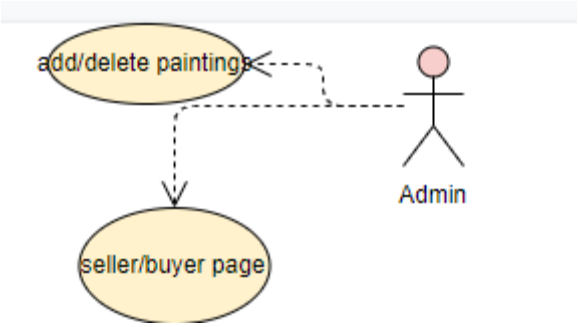


Figure 8: Admin case diagram

As described in Figure 8, the Administrator can login with the credentials and need to register with the webpage, the administrator can view the seller and buyer information, registered customer info, order history, payment history. The Administrator is responsible of managing the website and he has authority to block the seller if found suspicious. The Administrator can manage the roles of the user and admin can assign roles to the user. We have secured website using secured encryption protocol.

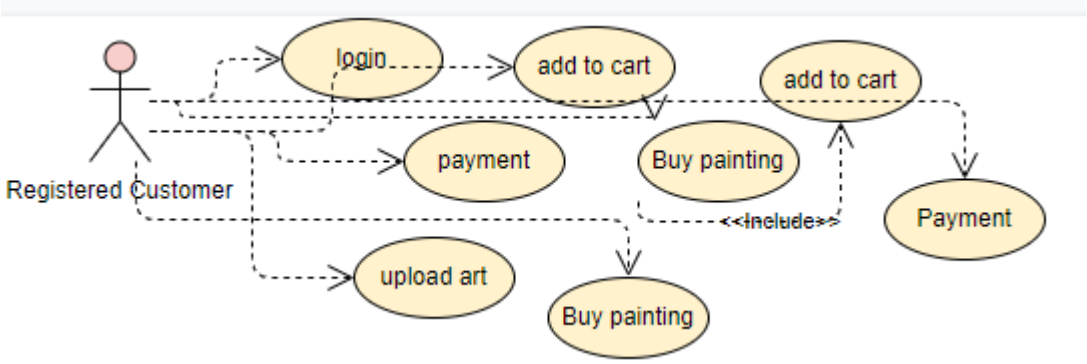


Figure 9: Buyer case diagram

As described in Figure 9, the User can sign up/ register first by using basic details like email, password, confirm password, roles. Once the User is registered, he can make use of the details to login using email and password. Once the user is logged in, he will be able to go to home page and view all the paintings. The Buyer can view the website, navigate and then revisit to buy artwork.

5 Internal/external Interface Impacts and Specification

We have made some restrictions for the website by allowing seller and buyer to sell and buy Artwork, but the admin only has authority to look at the seller and buyer information. Seller can make use of the My Art page to look at the art uploaded and to perform modifications by updating and removing Artwork from the website. The buyer can look at the order history, but the seller cannot. The seller is only able to view, modify, and upload their Artwork for purchase. The admin can remove or add the seller or buyer. The seller does not have access to buyer information and the seller does not have access to other seller information. Only the admin has the access to buyer and seller information.

6 Design Units Impacts

The project has different modules, but each has separate functionality, our home page consists of the list of paintings, arts uploaded by the seller. After they enter the user details a record is created in the Users

database table. The user can login with the username and password to search for Artwork based on their interest. A seller can upload the art and sell it for any user. The buyer can login and buy any number of arts. Admin can view all the seller and buyer information. User can login and check the list of order placed in order history. Buyer can add art to cart and then select a payment method to buy selected art.

6.1 Functional Area A/Design Unit

The gallery user will have all the authority to manage the transactions and track the transactions of the seller and buyer. The Online Art Gallery project has a database which consists of the art, user roles, roles, user claims, user login, users, cart, survey, and invoice.

6.1.1 Functional Overview

The Online Art Gallery project has a database which consists of the art, user roles, roles, user claims, user login, users, cart, survey, and invoice.

- Art table consists of id, image data, image name, description, price, category
- User Roles table consists of user id, role id
- Roles table consists of id, name
- User claims table consists of user id, claim type, claim value
- User login table consists of login provider, provider key, user id.
- Users table consists of user id, email, email confirmed, password hash, security stamp, phone number, username.
- Cart table consists of user id, cart id, image name, price and quantity, total.
- Invoice table consists of user id, email, shipping method, cc number, expiry date, credit card type, invoice total, date placed.
- Survey Table consists of the user id, valuable, visit, satisfied, easy, recommend, suggestions

6.1.2 Impacts

There are no known impacts of project on the functional area.

6.1.3 Requirements

***Business Requirements*:** The Online Art Gallery website consists of three main users which are gallery, seller and buyer. Gallery serves as an administrator of the website and can manage sellers, buyers, and transactions. The gallery user will have all the authority to manage the transactions and track the transactions of the seller and buyer. The gallery user can also add and delete the seller and buyer. This website consists of different types of paintings and artists information which allows the seller to add their Artwork. The buyer can buy the Artwork from the gallery.

***User Requirements*:** The Online Art Gallery is an online application that will be used to display and sell Artwork. Both buyers and sellers will benefit from the utilization of the website as it will feature a variety of artists and their Artwork. The Online Art Gallery is useful for art lovers, artists and people all around who want to purchase or display their Artwork. This application helps the users or end-end customers to search their paintings and arts and place the order for selected Artwork online. The user can also get the information about the different types of Artwork such as the name, description, price, and category.

Functional Requirements: To develop an interactive website to facilitate an Online Art Gallery. The website will allow interaction between the gallery, buyers and sellers. E-commerce is facilitated through

dynamic websites. Dynamic websites are comprised of dynamic webpages. In order to create a cohesive experience, the following components are required:

Quality of Service Requirements: The Online Art Gallery provides artists the ability to register online and be a member of the Online Art Gallery. Each artist can upload a digital copy of their Artwork. The seller can upload their Artwork either for a fixed price.

Implementation Requirements: The software development life cycle (SDLC) is a framework defining tasks performed at each step in the software development process. SDLC is a structure followed by a development team within the software organization. It consists of a detailed plan describing how to develop, maintain and replace specific software. A detail Implementation Project Plan is provided in the Appendix of this document.

Compliance requirements: Only the admin has the access to administration page.

Security requirements: Implementation of the Identity Framework and the HTTPS protocol within the Transaction page defines most of the security requirements.

Scalability requirements: The Online Art Gallery is designed to manage and store data that artists submit to the website with the utilization Microsoft SQL Server.

Integration requirements**:** A windows environment/server is required to deploy the Online Art Gallery since it requires the utilization of the .Net Framework and Microsoft SQL Server.

7 Open Issues

We were not able to implement an autocomplete function within the search text in the home page and the ability to allow the seller to view which user purchased their Artwork.

8 Acknowledgements

We express our gratitude to Professor Xin Chen, for guiding us throughout the project and for the encouragement which helped us in successful completion of our project. Finally, we would like to thank each everyone in the team for making this project successful.

9 References

Captain, F. (2015). Six-Step Relational Database Design (2nd

ed.). Lexington, KY.

Delamater, M. & Boehm, A. (2016). Murach's ASP.NET web programming

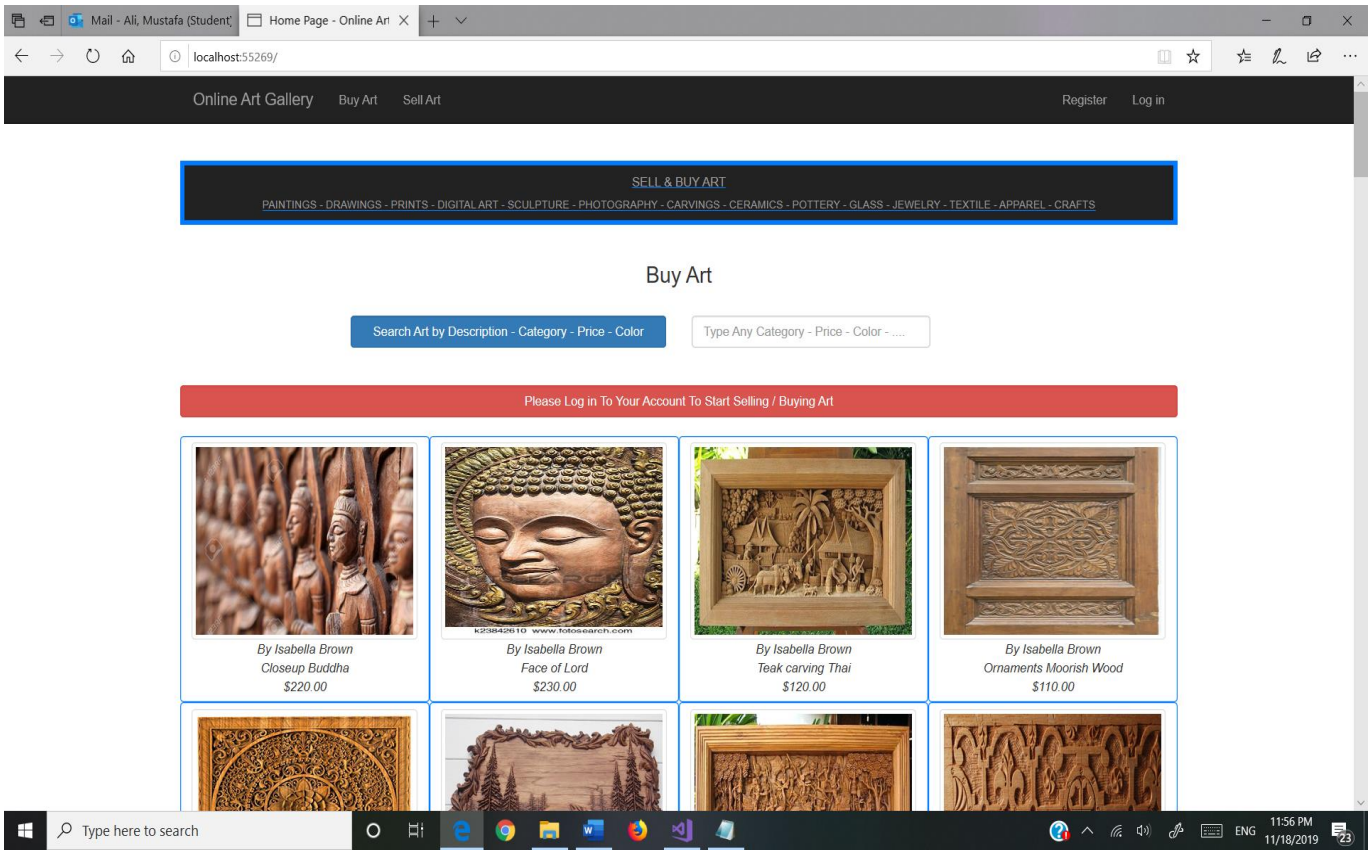
with C# (6th ed.). Fresno, CA.

Duckett, J. (2011). HTML & CSS Design and Build Websites (1st ed.). Indianapolis, IN: Wiley & Sons.

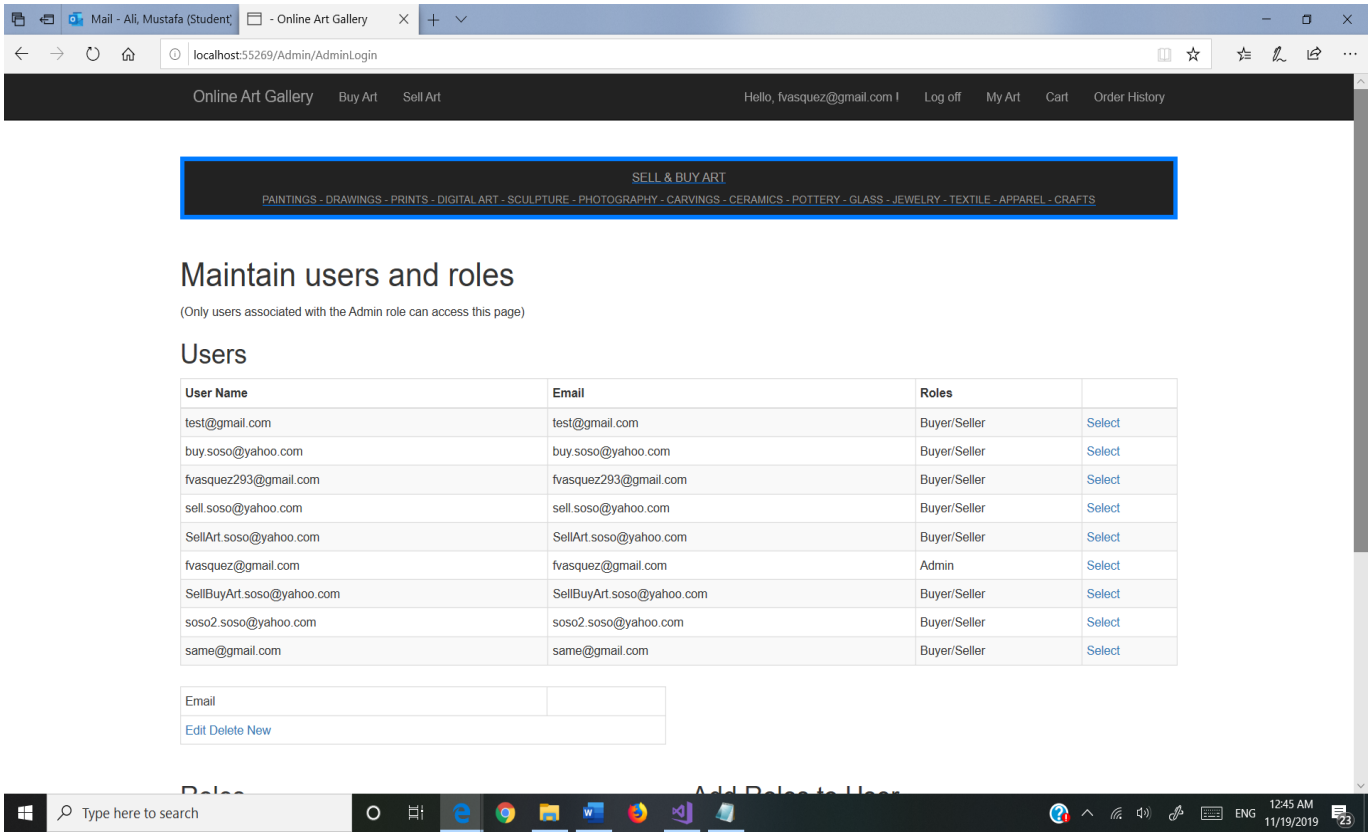
Oura, F., Kobayashi, N., & Shirasaka, S. (2019). A proposal of reference model driven modeling framework for clarification of business concept. Review of Integrative Business and Economics Research, 9(3), 90-107. Retrieved from https://search.proquest.com/docview/2303161046?accountid=6363

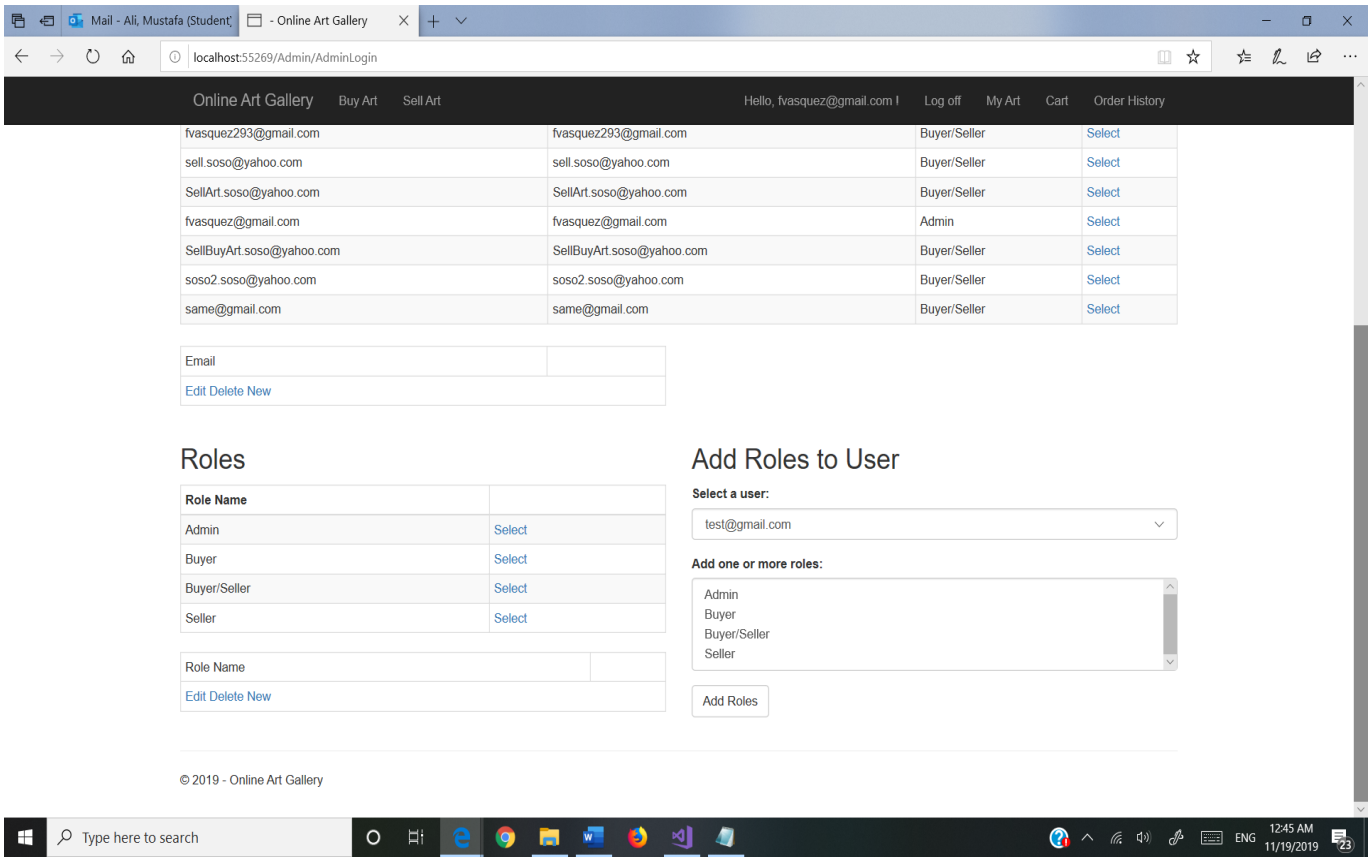
10 Appendices

Home page:

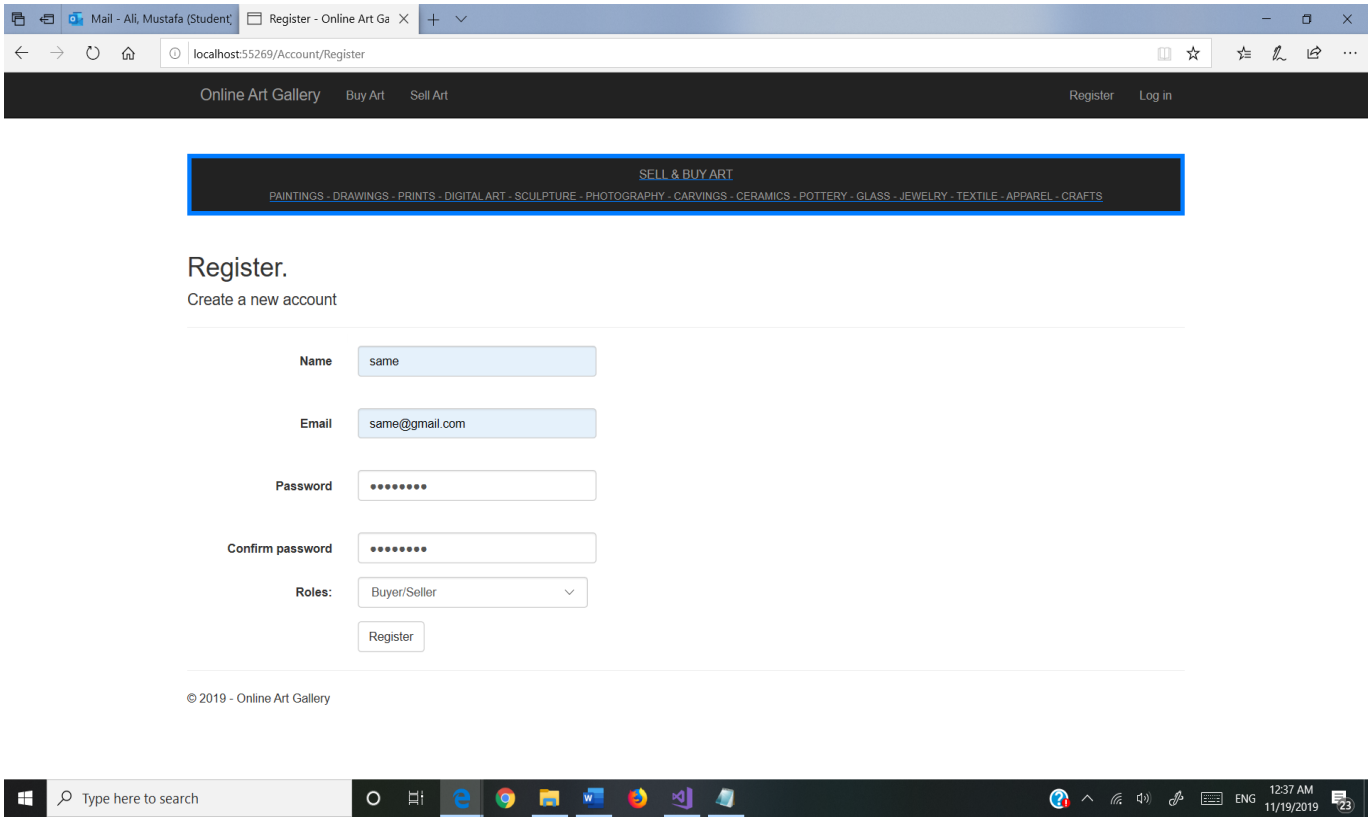


Admin Page:

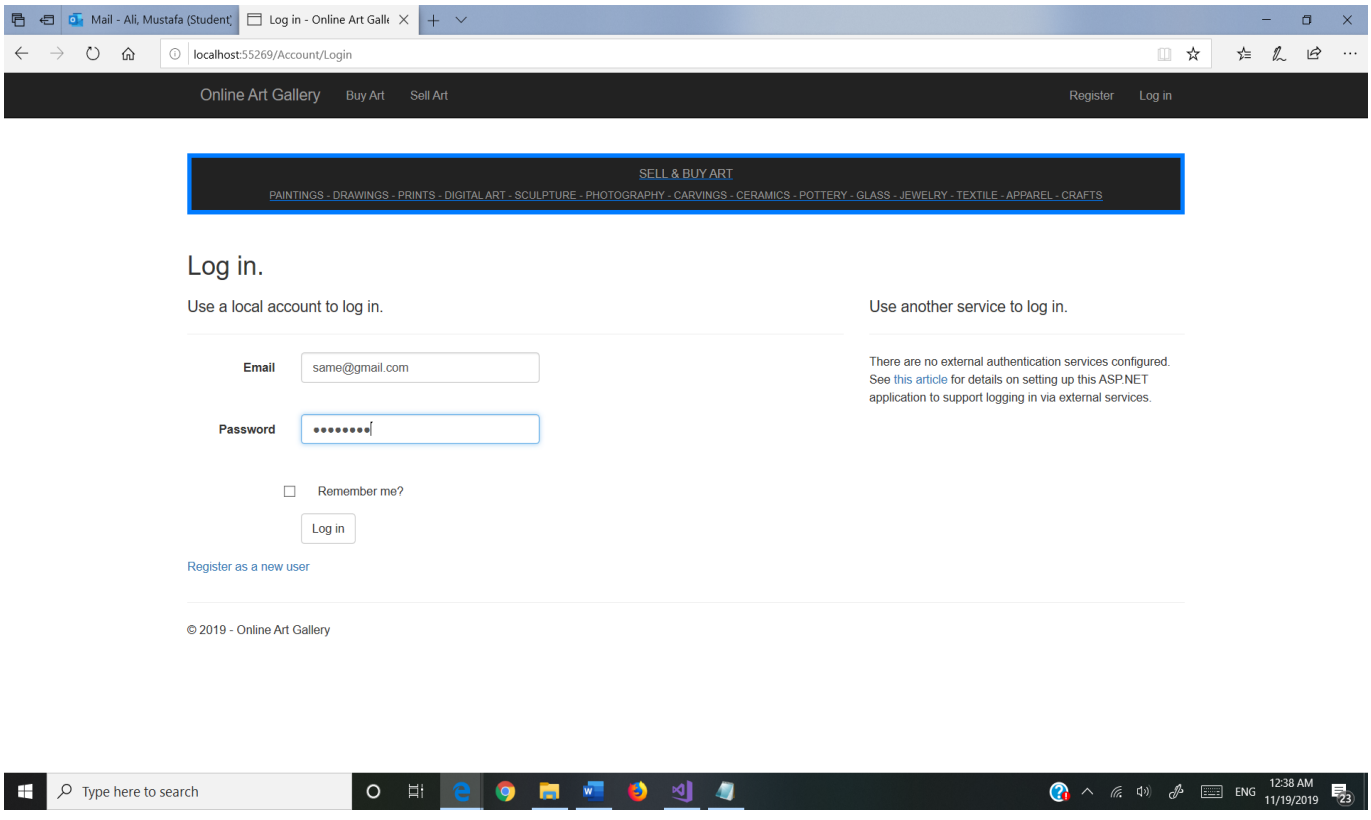




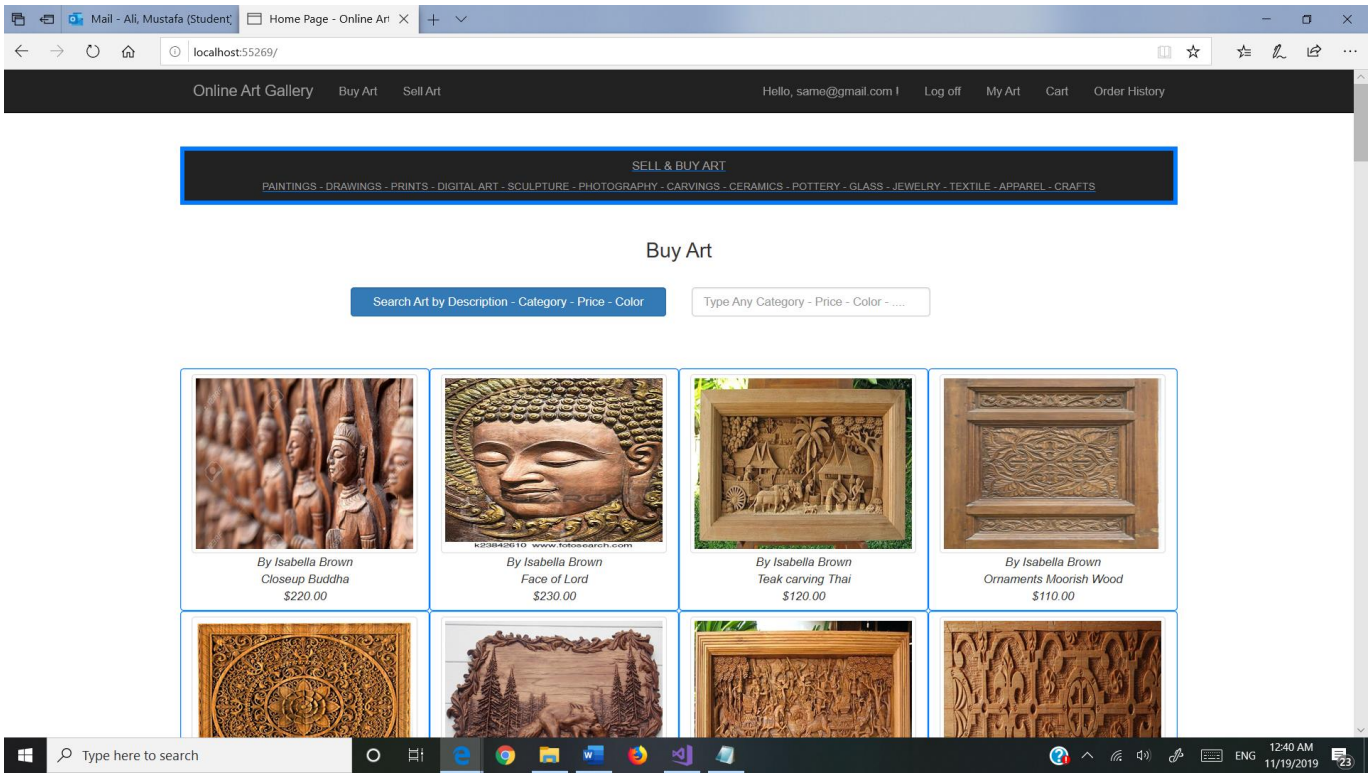
Registration Page:



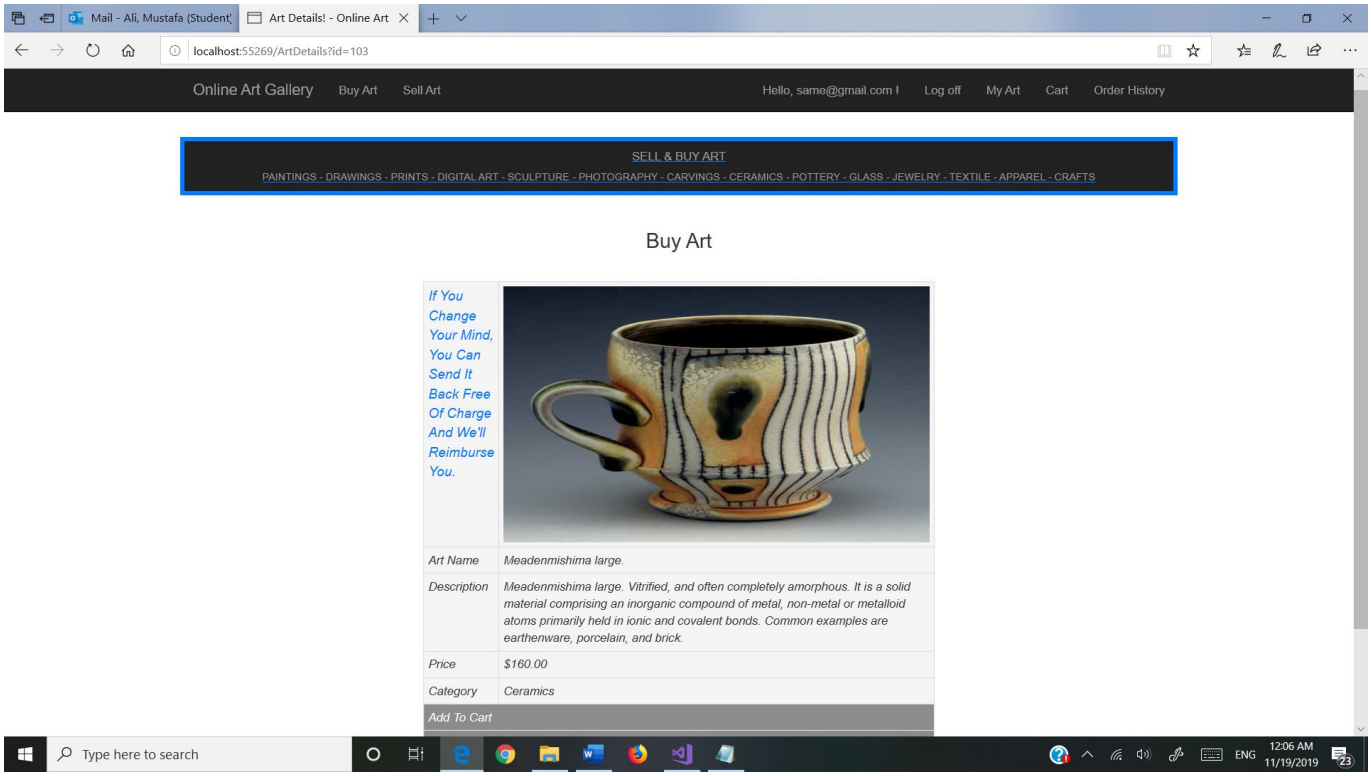
Login Page:



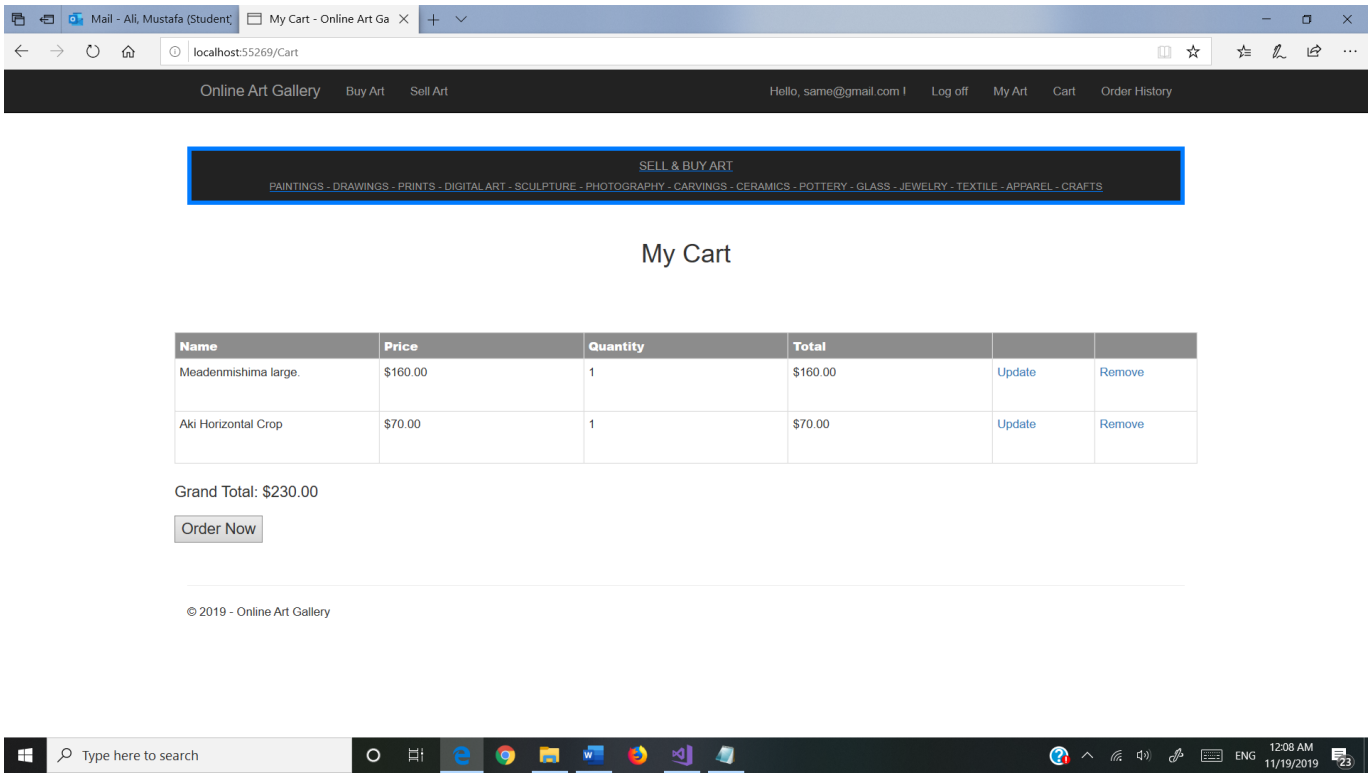
Buy Art Page:



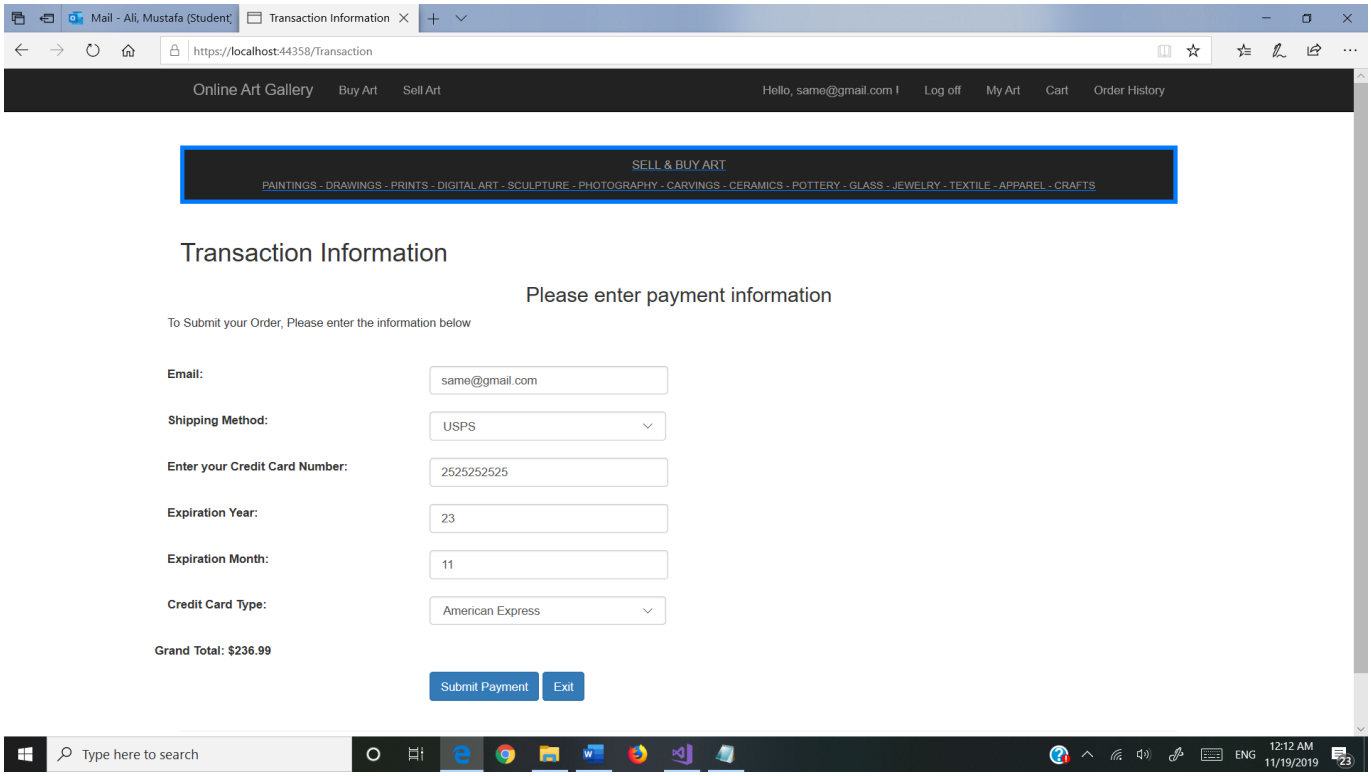
Art Details Page:



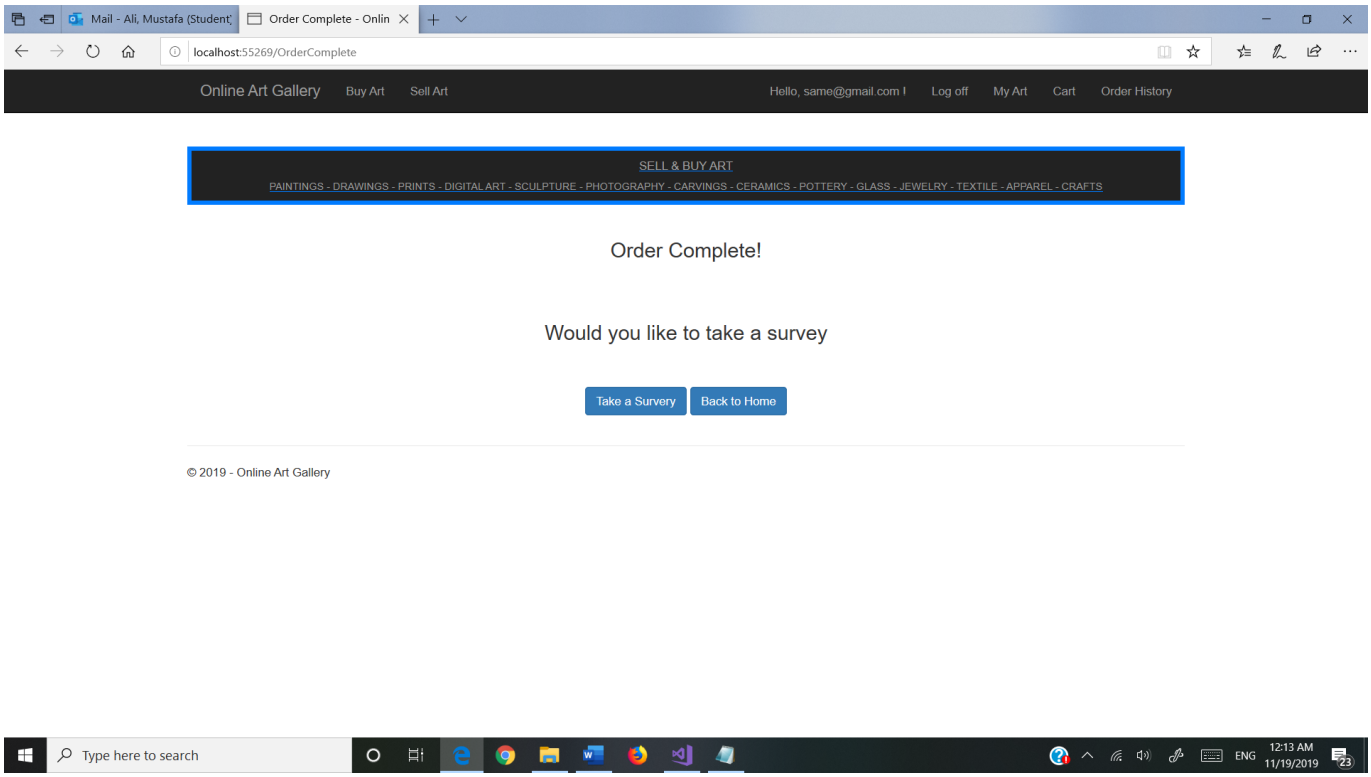
My Cart Page:



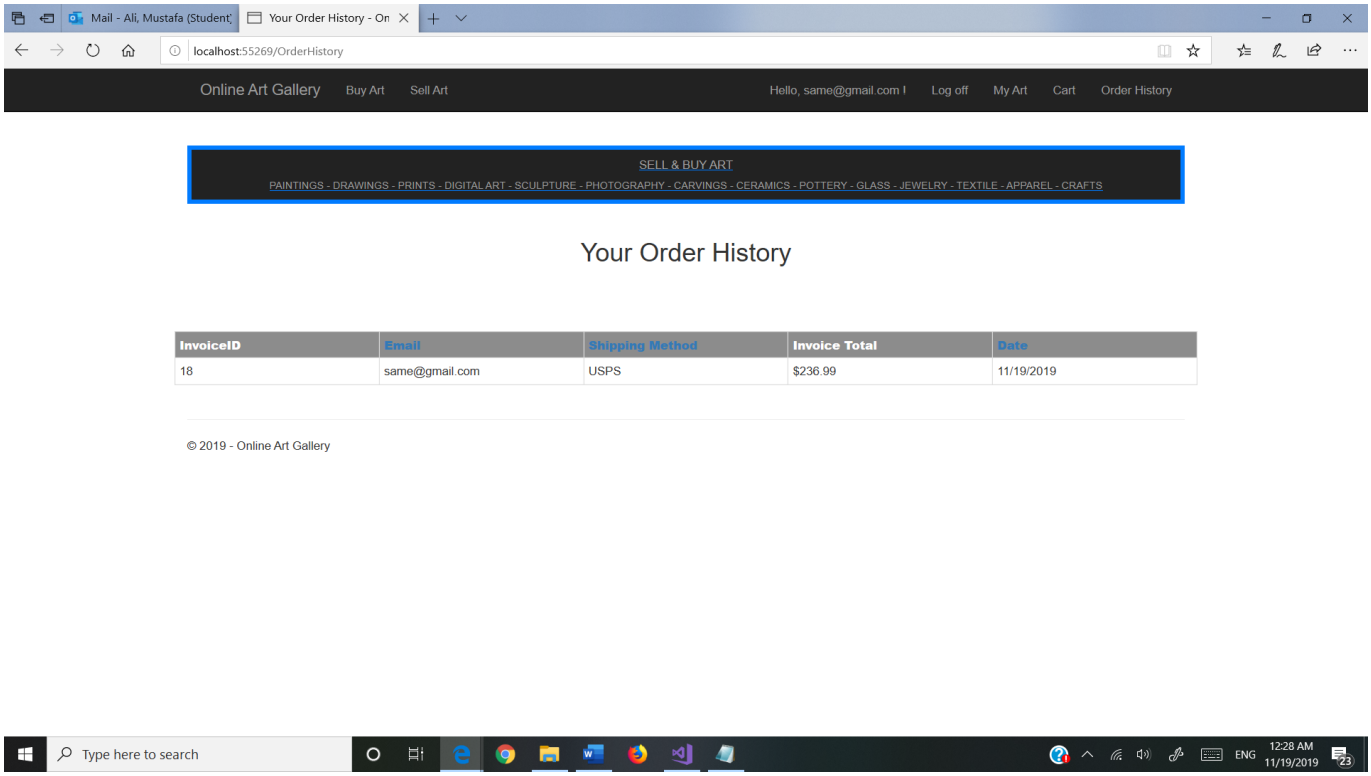
Transaction Page:



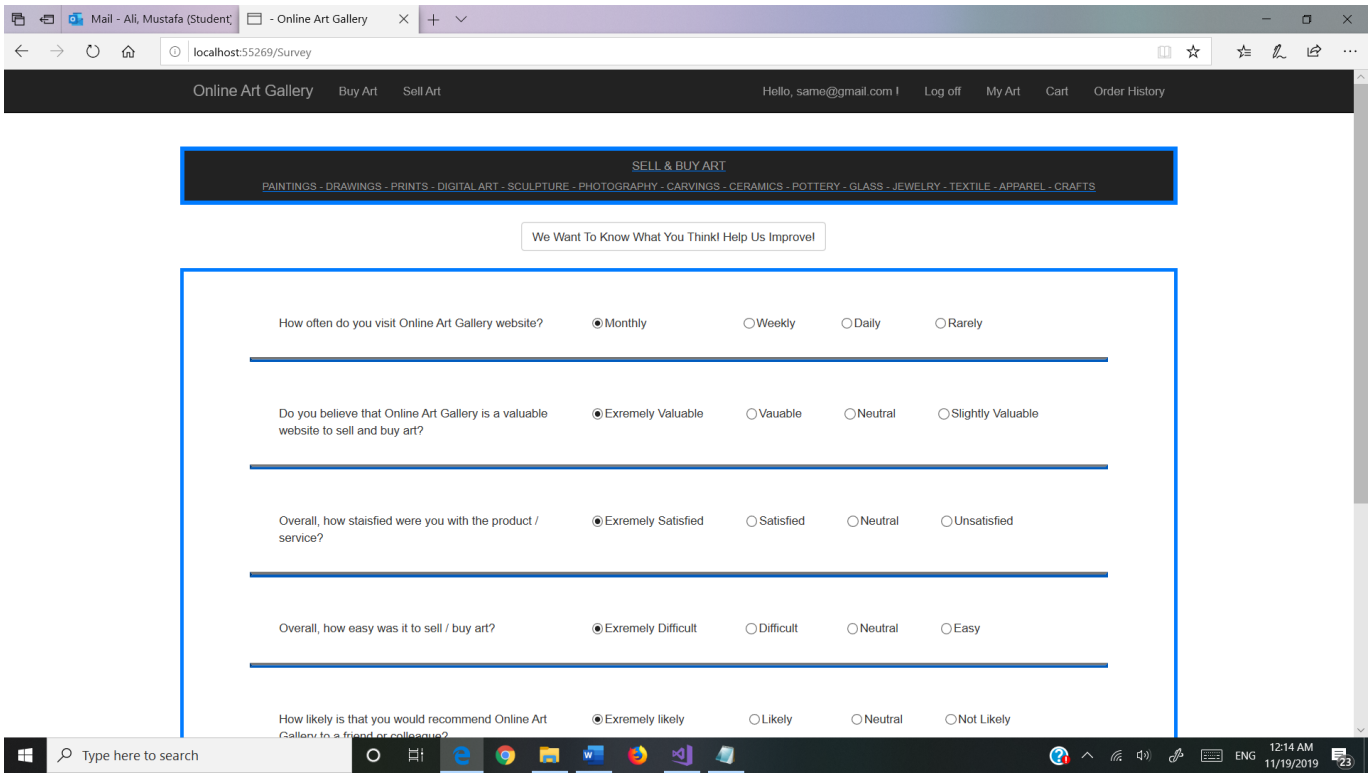
Order Complete Page:



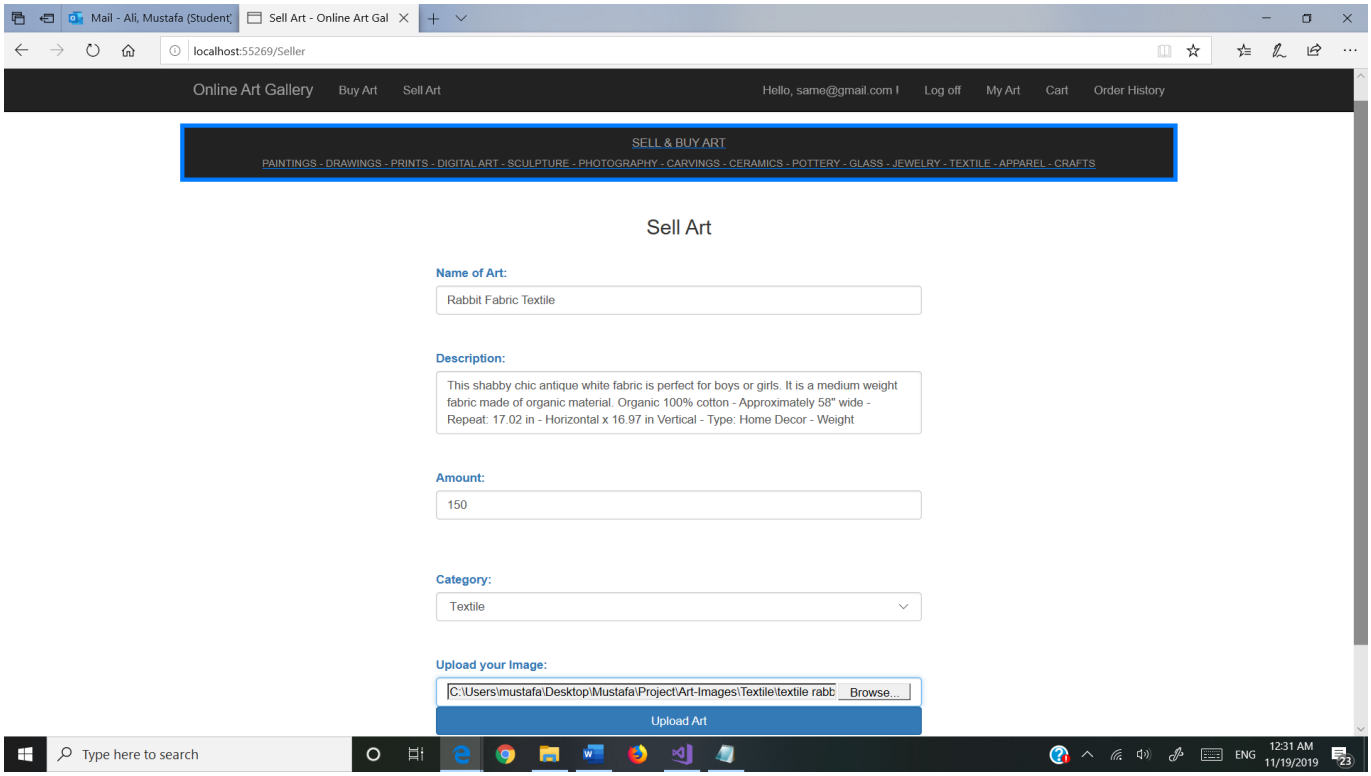
Order History Page:



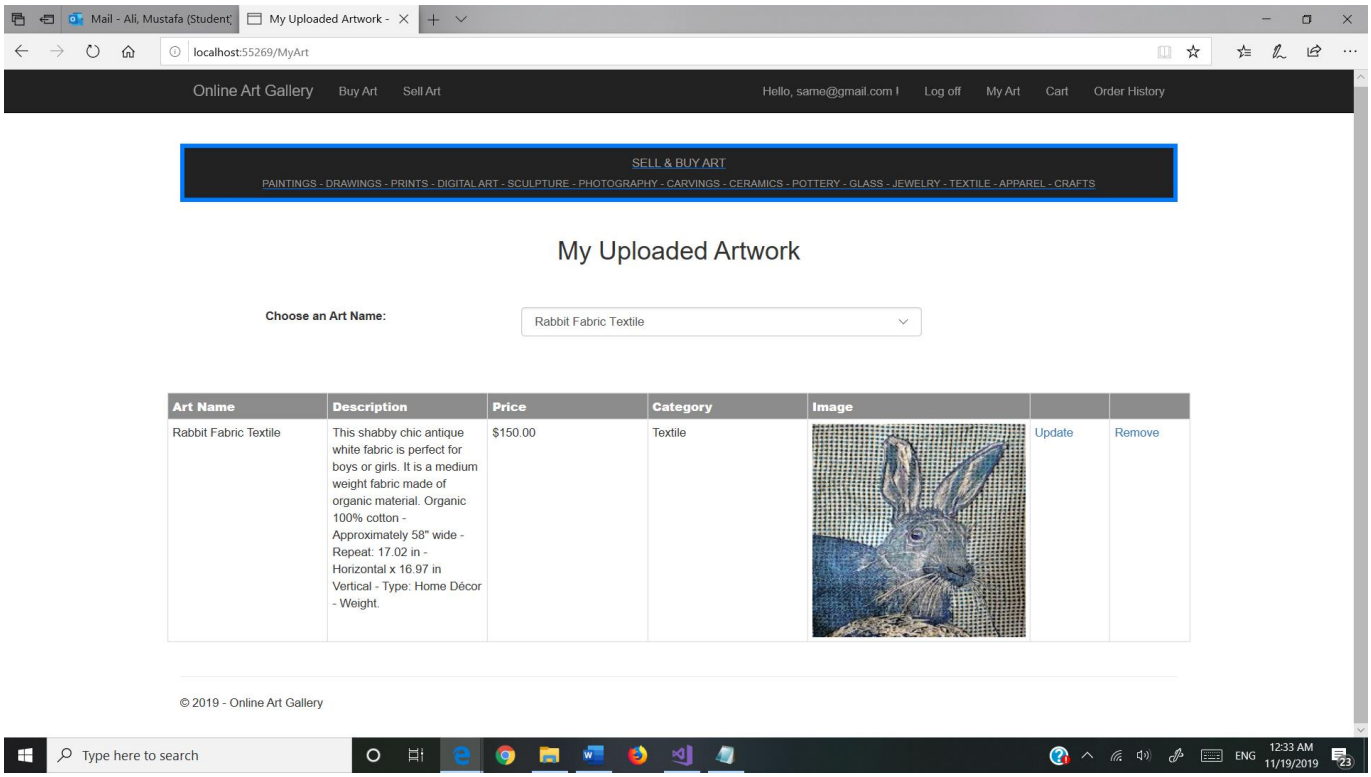
Survey Page:



Seller Page:



My Art Page: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My Uploaded Artwork -
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Online Art Gallery
Buy Art
Sell Art
Hello, same@gmail.com !
Log off
My Art
Cart
Order History
SELL & BUY ART
PAINTINGS - DRAWINGS - PRINTS - DIGITAL ART - SCULPTURE - PHOTOGRAPHY - CARVINGS - CERAMICS - POTTERY - GLASS - JEWELRY - TEXTILE - APPAREL - CRAFTS
My Uploaded Artwork
Choose an Art Name:
Rabbit Fabric Textile
Art Name
Description
Price
Category
Image
Rabbit Fabric Textile
This shabby chic antique white fabric is perfect for boys or girls. It is a medium weight fabric made of organic material. Organic 100% cotton - Approximately 58" wide - Repeat: 17.02 in - Horizontal x 16.97 in Vertical - Type: Home Décor - Weight.
$150.00
Textile
Update
Remove
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ENG
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