

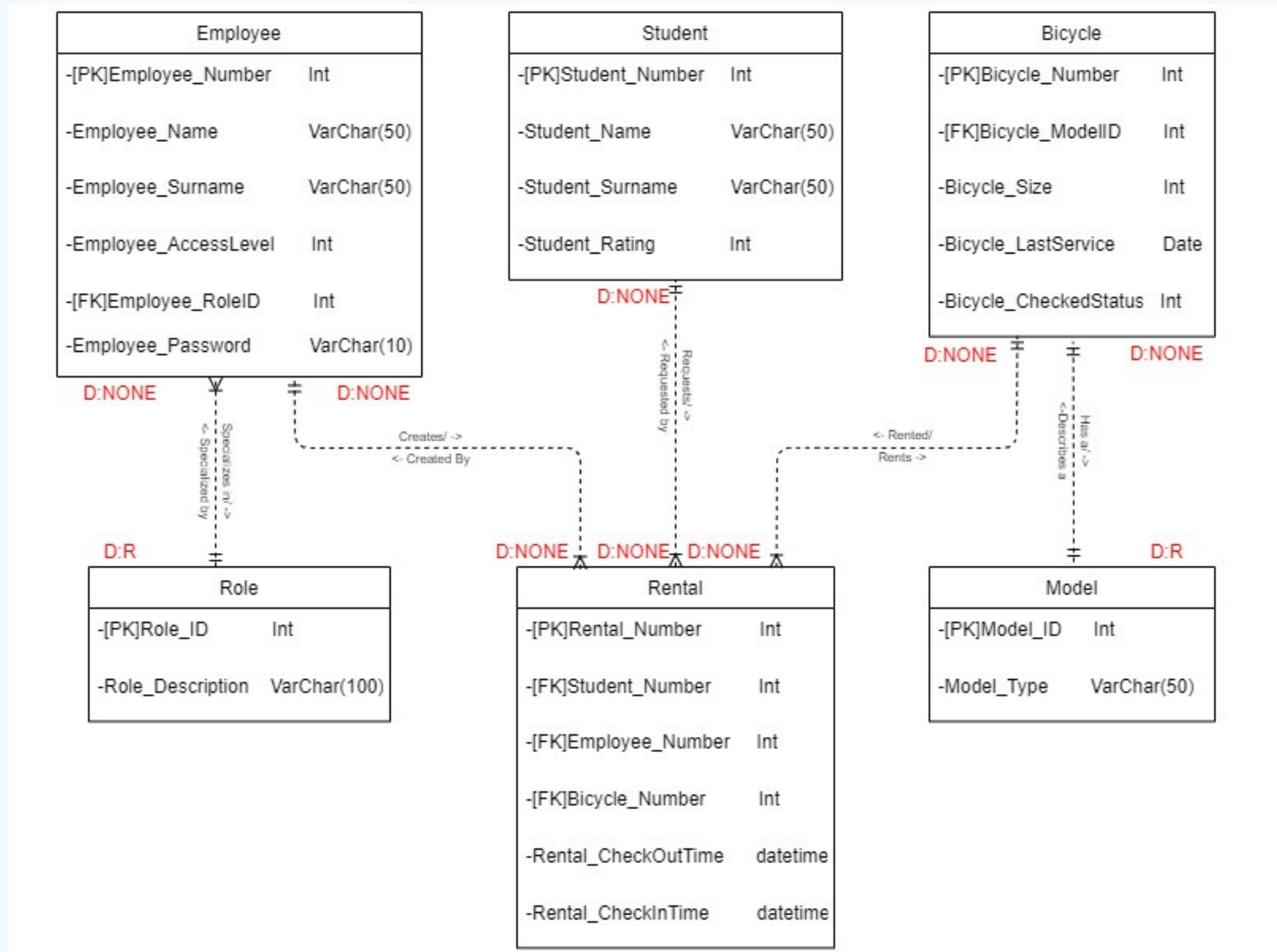
GROUP 09

BICYCLE RENTAL SYSTEM

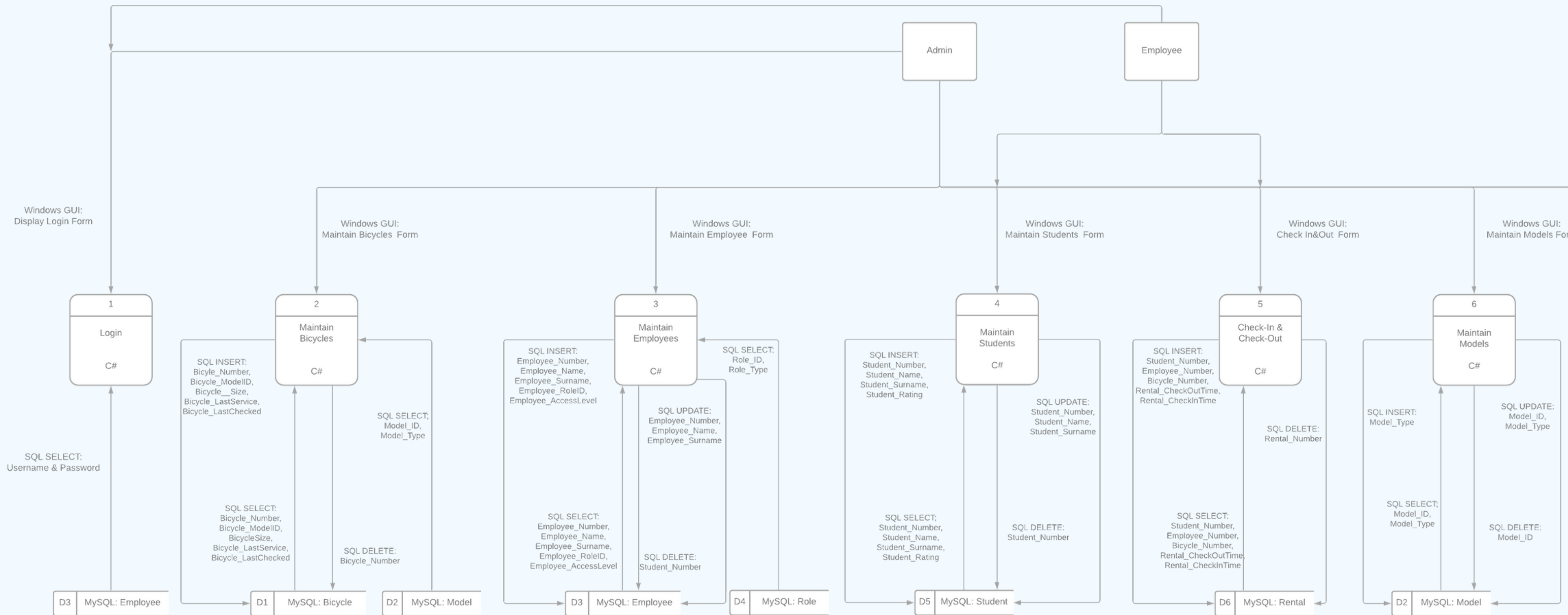
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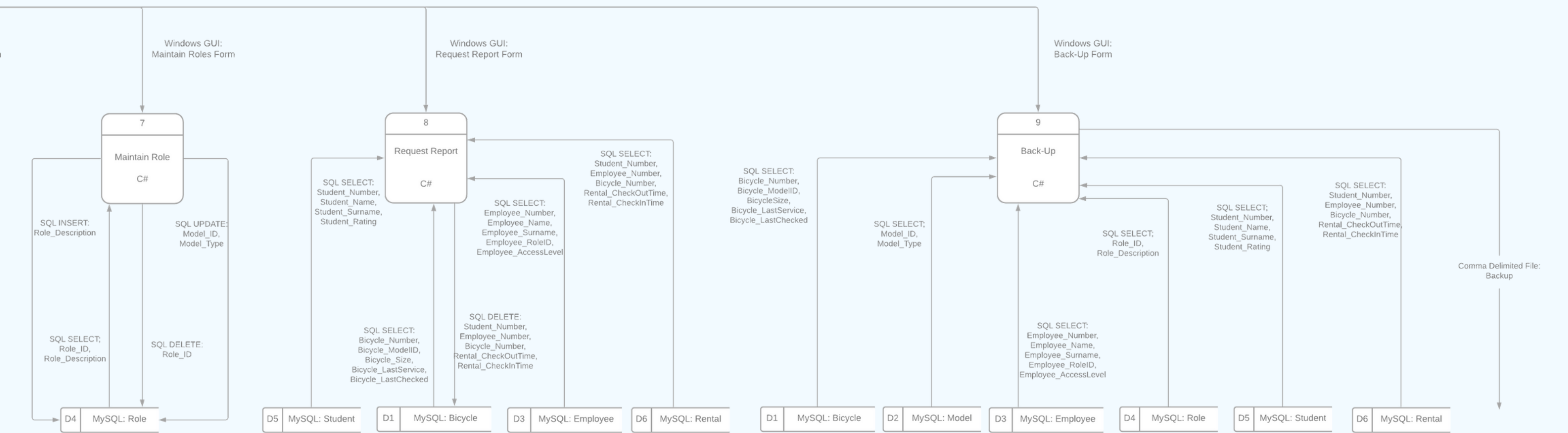
Physical Data Model



Physical Process Model



Physical Process Model Cont



DBMS SCREENSHOTS

1)EMPLOYEE TABLE

The screenshot displays the SQL Server Enterprise Designer interface for a table named 'bicycle' in the 'dbo' schema. The 'Design' tab is active, showing the table structure with columns: Bicycle_Number (int, primary key, clustered), Bicycle_ModelID (int, foreign key to bmodel.Model_ID), Bicycle_Size (int), Bicycle_LastService (datetime2(0), nullable), and Bicycle_CheckedStatus (binary(1), nullable). The 'T-SQL' tab shows the corresponding CREATE TABLE and CREATE INDEX scripts. Below the script, a data preview table is shown with 15 rows of data.

Name	Data Type	Allow Nulls	Default
Bicycle_Number	int	<input type="checkbox"/>	
Bicycle_ModelID	int	<input type="checkbox"/>	
Bicycle_Size	int	<input type="checkbox"/>	
Bicycle_LastService	datetime2(0)	<input checked="" type="checkbox"/>	(NULL)
Bicycle_CheckedStatus	binary(1)	<input checked="" type="checkbox"/>	(NULL)

Keys (1)
<unnamed> (Primary Key, Clustered: Bicycle_Number)

Check Constraints (0)

Indexes (1)
FK_bicycles_Model_idx (Bicycle_ModelID)

Foreign Keys (1)
FK_bicycles_Model (Model_ID)

Triggers (0)

```
CREATE TABLE [dbo].[bicycle] (  
    [Bicycle_Number] INT IDENTITY (1, 1) NOT NULL,  
    [Bicycle_ModelID] INT NOT NULL,  
    [Bicycle_Size] INT NOT NULL,  
    [Bicycle_LastService] DATETIME2 (0) DEFAULT (NULL) NULL,  
    [Bicycle_CheckedStatus] BINARY (1) DEFAULT (NULL) NULL,  
    PRIMARY KEY CLUSTERED ([Bicycle_Number] ASC),  
    CONSTRAINT [FK_bicycles_Model] FOREIGN KEY ([Bicycle_ModelID]) REFERENCES [dbo].[bmodel] ([Model_ID]) ON UPDATE CASCADE  
);  
  
GO  
CREATE NONCLUSTERED INDEX [FK_bicycles_Model_idx]  
ON [dbo].[bicycle]([Bicycle_ModelID] ASC);
```

	Bicycle_Number	Bicycle_ModelID	Bicycle_Size	Bicycle_LastSer...	Bicycle_Checke...
	5	8	13	NULL	True
	6	7	15	NULL	True
	7	22	21	NULL	True
	8	9	23	NULL	True
	9	10	14	NULL	True
	10	11	16	NULL	True
	11	12	19	NULL	True
	12	14	20	NULL	True
	13	16	20	NULL	True
	15	20	16	NULL	True

DBMS SCREENSHOTS

2)MODEL TABLE

The screenshot displays the SQL Server Enterprise Manager interface for a table named `bmodel`. The top section shows the table's design with columns `Model_ID` (int, primary key, not null) and `Model_Type` (varchar(50), nullable). The bottom section shows the T-SQL script for creating the table:

```
CREATE TABLE [dbo].[bmodel] (  
    [Model_ID] INT IDENTITY (1, 1) NOT NULL,  
    [Model_Type] VARCHAR (50) DEFAULT (NULL) NULL,  
    PRIMARY KEY CLUSTERED ([Model_ID] ASC)  
);
```

On the right side, the 'Keys' pane shows a primary key constraint named '<unnamed>' on the `Model_ID` column. Below the T-SQL script, a data grid shows the following data:

	Model_ID	Model_Type
	7	Scott
	8	Giant
	9	Yeti
	10	Bianchi
	11	Surly
	12	Trek
	13	Raleigh
	14	GT
	15	Cannodale
	16	Merida
	17	Fuji

DBMS SCREENSHOTS

3)EMPLOYEE TABLE

The screenshot displays the SQL Server Enterprise Manager interface for the 'Employee' table. The top pane shows the table's design, and the bottom pane shows the corresponding T-SQL script.

Name	Data Type	Allow Nulls	Default
Employee_Number	int	<input type="checkbox"/>	
Employee_Name	varchar(50)	<input checked="" type="checkbox"/>	(NULL)
Employee_Surname	varchar(50)	<input checked="" type="checkbox"/>	(NULL)
Employee_AccessLevel	int	<input type="checkbox"/>	('1')
Employee_RoleID	int	<input type="checkbox"/>	
Employee_Password	varchar(20)	<input checked="" type="checkbox"/>	(NULL)

Keys (1)
<unnamed> (Primary Key, Clustered: Employee_Number)

Check Constraints (0)

Indexes (1)
FK_employees_Role_idx (Employee_RoleID)

Foreign Keys (1)
FK_employees_Role (Role_ID)

Triggers (0)

```
CREATE TABLE [dbo].[employee] (  
    [Employee_Number] INT IDENTITY (1, 1) NOT NULL,  
    [Employee_Name] VARCHAR (50) DEFAULT (NULL) NULL,  
    [Employee_Surname] VARCHAR (50) DEFAULT (NULL) NULL,  
    [Employee_AccessLevel] INT DEFAULT ('1') NOT NULL,  
    [Employee_RoleID] INT NOT NULL,  
    [Employee_Password] VARCHAR (20) DEFAULT (NULL) NULL,  
    PRIMARY KEY CLUSTERED ([Employee_Number] ASC),  
    CONSTRAINT [FK_employees_Role] FOREIGN KEY ([Employee_RoleID]) REFERENCES [dbo].[role] ([Role_ID]) ON UPDATE CASCADE  
);  
  
GO  
CREATE NONCLUSTERED INDEX [FK_employees_Role_idx]  
ON [dbo].[employee]([Employee_RoleID] ASC);
```

Employee_Nu...	Employee_Na...	Employee_Surn...	Employee_Acc...	Employee_Rol...	Employee_Pass...
2	WJ	van Zyl	1	1	qwertyuiop
3	Brenden	Greeff	1	7	asdfghjkl
4	Austin	Gronbeck	2	6	zxcvbnm
5	Timon	Augustyn	3	2	poiuytrewq
6	Francois	Kruger	4	3	lkjhgfdsa
7	Marnus	Enslin	5	5	mnbvcxz
8	Efraim	Steenberg	5	5	1234567890
9	Franco	Schumyn	2	4	0987654321

DBMS SCREENSHOTS

4)RENTAL TABLE

Name	Data Type	Allow Nulls	Default
Rental_Number	int	<input type="checkbox"/>	
Student_Number	char(8)	<input type="checkbox"/>	
Employee_Number	int	<input type="checkbox"/>	
Bicycle_Number	int	<input type="checkbox"/>	
Rental_CheckOutTime	datetime2(0)	<input checked="" type="checkbox"/>	(NULL)
Rental_CheckInTime	datetime2(0)	<input checked="" type="checkbox"/>	(NULL)
		<input type="checkbox"/>	

Keys (1)

<unnamed> (Primary Key, Clustered: Rental_Number)

Check Constraints (0)

Indexes (3)

FK_rentals_Student_Number_idx (Student_Number)

FK_rentals_Employee_Number_idx (Employee_Number)

FK_rentals_Bicycle_Number_idx (Bicycle_Number)

Foreign Keys (3)

FK_rentals_Bicycle_Number (Bicycle_Number)

FK_rentals_Employee_Number (Employee_Number)

FK_rentals_Student_Number (Student_Number)

Triggers (0)

Design

T-SQL

```
CREATE TABLE [dbo].[rental] (  
    [Rental_Number] INT IDENTITY (1, 1) NOT NULL,  
    [Student_Number] CHAR (8) NOT NULL,  
    [Employee_Number] INT NOT NULL,  
    [Bicycle_Number] INT NOT NULL,  
    [Rental_CheckOutTime] DATETIME2 (0) DEFAULT (NULL) NULL,  
    [Rental_CheckInTime] DATETIME2 (0) DEFAULT (NULL) NULL,  
    PRIMARY KEY CLUSTERED ([Rental_Number] ASC),  
    CONSTRAINT [FK_rentals_Bicycle_Number] FOREIGN KEY ([Bicycle_Number]) REFERENCES [dbo].[bicycle] ([Bicycle_Number]) ON UPDATE CASCADE,  
    CONSTRAINT [FK_rentals_Employee_Number] FOREIGN KEY ([Employee_Number]) REFERENCES [dbo].[employee] ([Employee_Number]) ON UPDATE CASCADE,  
    CONSTRAINT [FK_rentals_Student_Number] FOREIGN KEY ([Student_Number]) REFERENCES [dbo].[student] ([Student_Number]) ON UPDATE CASCADE  
);
```

	Rental_Number	Student_Numb...	Employee_Nu...	Bicycle_Number	Rental_CheckO...	Rental_CheckIn...
	3	00000001	2	10	12/10/2020 23:...	12/10/2020 23:...
	4	00000002	2	11	12/10/2020 23:...	13/10/2020 00:...
	5	00000003	2	12	12/10/2020 23:...	12/10/2020 23:...

DBMS SCREENSHOTS

5)ROLE TABLE

The screenshot displays the SQL Server Enterprise Manager interface for a table named 'role'. The top section shows the table's design with columns: Role_ID (int, primary key, not null), Role_Description (varchar(100), nullable), and an unnamed column (int, nullable). The right pane shows the table's properties, including a primary key on Role_ID. The bottom pane shows the T-SQL script for creating the table.

Table Design:

Name	Data Type	Allow Nulls	Default
Role_ID	int	<input type="checkbox"/>	
Role_Description	varchar(100)	<input checked="" type="checkbox"/>	(NULL)
		<input type="checkbox"/>	

T-SQL Script:

```
CREATE TABLE [dbo].[role] (  
    [Role_ID] INT IDENTITY (1, 1) NOT NULL,  
    [Role_Description] VARCHAR (100) DEFAULT (NULL) NULL,  
    PRIMARY KEY CLUSTERED ([Role_ID] ASC)  
);
```

	Role_ID	Role_Descripti...
	1	Admin
	2	Office Manager
	3	POS Operator
	4	Maintanance St...
	5	Receptionist
	6	Bookkeeper
	7	Branch Manager

DBMS SCREENSHOTS

6) STUDENT TABLE

The screenshot displays the SQL Server Enterprise Designer interface for the 'student' table. The top pane shows the table's design with columns: Student_Number (char(8), NOT NULL, Primary Key), Student_Name (varchar(50), NULL), Student_Surname (varchar(50), NULL), and Student_Rating (int, NULL). The bottom pane shows the T-SQL script for creating the table. The right pane shows the table's properties, including Keys (1), Check Constraints (0), Indexes (0), Foreign Keys (0), and Triggers (0).

Table Design:

Name	Data Type	Allow Nulls	Default
Student_Number	char(8)	<input type="checkbox"/>	
Student_Name	varchar(50)	<input checked="" type="checkbox"/>	(NULL)
Student_Surname	varchar(50)	<input checked="" type="checkbox"/>	(NULL)
Student_Rating	int	<input checked="" type="checkbox"/>	(NULL)

T-SQL Script:

```
CREATE TABLE [dbo].[student] (  
    [Student_Number] CHAR (8) NOT NULL,  
    [Student_Name] VARCHAR (50) DEFAULT (NULL) NULL,  
    [Student_Surname] VARCHAR (50) DEFAULT (NULL) NULL,  
    [Student_Rating] INT DEFAULT (NULL) NULL,  
    PRIMARY KEY CLUSTERED ([Student_Number] ASC)  
);
```

Table Data:

Student_Numb...	Student_Name	Student_Surna...	Student_Rating
00000001	Ane	Schymyn	NULL
00000002	Lara	Otto	NULL
00000003	Leonard	de Jager	NULL
00000004	Nick	de Jager	NULL
00000005	Marius	Lubbe	NULL
00000006	Niel	Foxcroft	NULL
00000007	Jason	Mini	NULL
00000008	Waldo	Kloppers	NULL
00000009	Anzelle	Steenberg	NULL
00000010	Niel	Steenberg	NULL
00000011	Gustav	Prinsloo	NULL

Example Code

Add and Edit Bicycle

```
using Bicycle_Rental_System.Database;
using System;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using System.Windows.Forms;

namespace Bicycle_Rental_System.GUI.MaintainBicycles
{
    4 references
    public partial class AddBicycleForm : Form
    {
        private MainForm main;
        private List<int> models = new List<int>();

        1 reference
        public AddBicycleForm(MainForm main)
        {
            InitializeComponent();
            this.main = main;
            loadModels();
        }

        1 reference
        private void loadModels()
        {
            comboBox_Model.Items.Clear();
            models.Clear();
            foreach (bmodel m in main.databaseEntities.bmodels)
            {
                comboBox_Model.Items.Add(m.Model_Type);
                models.Add(m.Model_ID);
            }
            if (comboBox_Model.Items.Count > 0)
                comboBox_Model.SelectedIndex = 0;
        }

        1 reference
        private void button_Add_Click(object sender, EventArgs e)
        {
            bicycle b = new bicycle();
            b.Bicycle_ModelID = models[comboBox_Model.SelectedIndex];
            b.Bicycle_Size = (int)numericUpDown_Size.Value;
            b.Bicycle_CheckedStatus = false;
            main.databaseEntities.bicycles.Add(b);
            main.databaseEntities.SaveChanges();
            this.Close();
        }
    }
}
```

```
namespace Bicycle_Rental_System.GUI.MaintainBicycles
{
    4 references
    public partial class ChangeBicycleForm : Form
    {
        private MainForm main;
        private bicycle bic;
        private List<int> models = new List<int>();

        1 reference
        public ChangeBicycleForm(MainForm main, bicycle bic)
        {
            InitializeComponent();
            this.main = main;
            this.bic = bic;
            label_Number.Text = bic.Bicycle_Number.ToString();
            numericUpDown_Size.Value = bic.Bicycle_Size;
            loadModels();
        }

        1 reference
        private void loadModels()
        {
            comboBox_Model.Items.Clear();
            models.Clear();
            foreach (bmodel m in main.databaseEntities.bmodels)
            {
                comboBox_Model.Items.Add(m.Model_Type);
                models.Add(m.Model_ID);
                if (m.Model_ID == bic.Bicycle_ModelID)
                    comboBox_Model.SelectedIndex = models.Count - 1;
            }
        }

        1 reference
        private void button_Change_Click(object sender, EventArgs e)
        {
            bic.Bicycle_ModelID = models[comboBox_Model.SelectedIndex];
            bic.Bicycle_Size = (int)numericUpDown_Size.Value;
            main.databaseEntities.SaveChanges();
            this.Close();
        }
    }
}
```


Example Code

Add and Edit Roles

```
namespace Bicycle_Rental_System.GUI.MaintainRoles
{
    4 references
    public partial class AddRoleForm : Form
    {
        private MainForm main;
        1 reference
        public AddRoleForm(MainForm main)
        {
            InitializeComponent();
            this.main = main;
        }

        1 reference
        private void button_Add_Click(object sender, EventArgs e)
        {
            role r = new role();
            r.Role_Description = maskedTextBox_RoleDescription.Text.ToString();
            main.databaseEntities.roles.Add(r);
            main.databaseEntities.SaveChanges();
            this.Close();
        }
    }
}
```

```
namespace Bicycle_Rental_System.GUI.MaintainRoles
{
    4 references
    public partial class ChangeRoleForm : Form
    {
        private MainForm main;
        private role rol;

        1 reference
        public ChangeRoleForm(MainForm main, role rol)
        {
            InitializeComponent();
            this.main = main;
            this.rol = rol;
            label_RoleID.Text = rol.Role_ID.ToString();
            textBox_RoleDescription.Text = rol.Role_Description;
        }

        1 reference
        private void button_Change_Click(object sender, EventArgs e)
        {
            rol.Role_Description = textBox_RoleDescription.Text;
            main.databaseEntities.SaveChanges();
            this.Close();
        }
    }
}
```

Example Code

Login

```
namespace Bicycle_Rental_System.GUI
{
    4 references
    public partial class LoginControl : UserControl
    {
        private MainForm main;

        1 reference
        public LoginControl(MainForm main)
        {
            InitializeComponent();
            label_Info.Text = "";
            this.main = main;
            main.AcceptButton = button_Login;
        }

        1 reference
        private void button_Login_Click(object sender, EventArgs e)
        {
            login();
        }

        1 reference
        private void login()
        {
            String employee_number = textBox_EmployeeNumber.Text;
            String password = textBox_Password.Text;

            label_Info.Text = "";

            employee emp;

            if (employee_number == "")
                label_Info.Text = "Please enter a employee number!";
            else if (password == "")
                label_Info.Text = "Please enter a password!";
            else if ((emp = main.databaseEntities.employees.Find(Int32.Parse(employee_number))) == null)
                label_Info.Text = "Employee Number does not exist!";
            else if (emp.Employee_Password != password)
                label_Info.Text = "Incorrect password!";
            else
                main.login(emp);
        }
    }
}
```

REPORTS

BRS Bicycle Rental System

WJ van ZylLogout

Check In & OutBicyclesModelsStudentsReportEmployeesRolesBackup

Timespan

1

☒ Days

☐ Weeks

☐ Months

☐ Years

Report

Summary

Total Rentals:
10

Total Students:
8

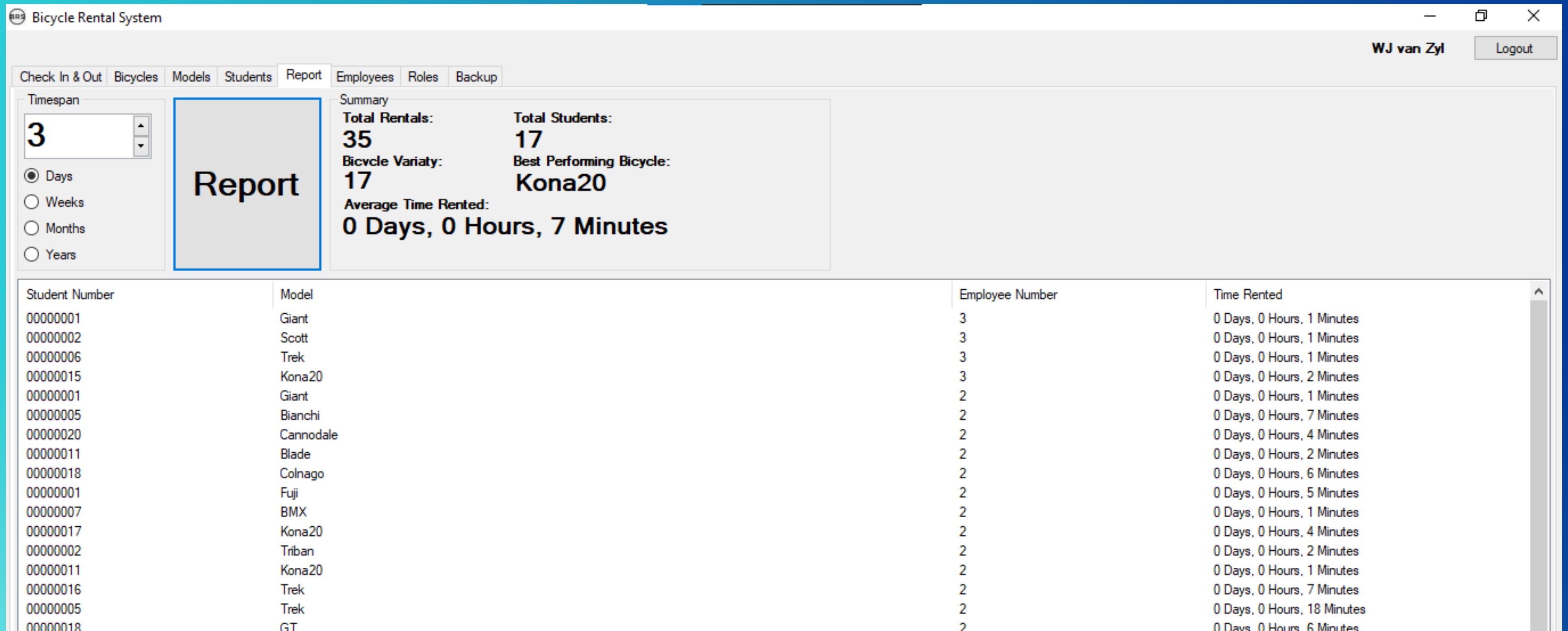
Bicycle Variaty:
9

Best Performing Bicycle:
Kona20

Average Time Rented:
0 Days, 0 Hours, 3 Minutes

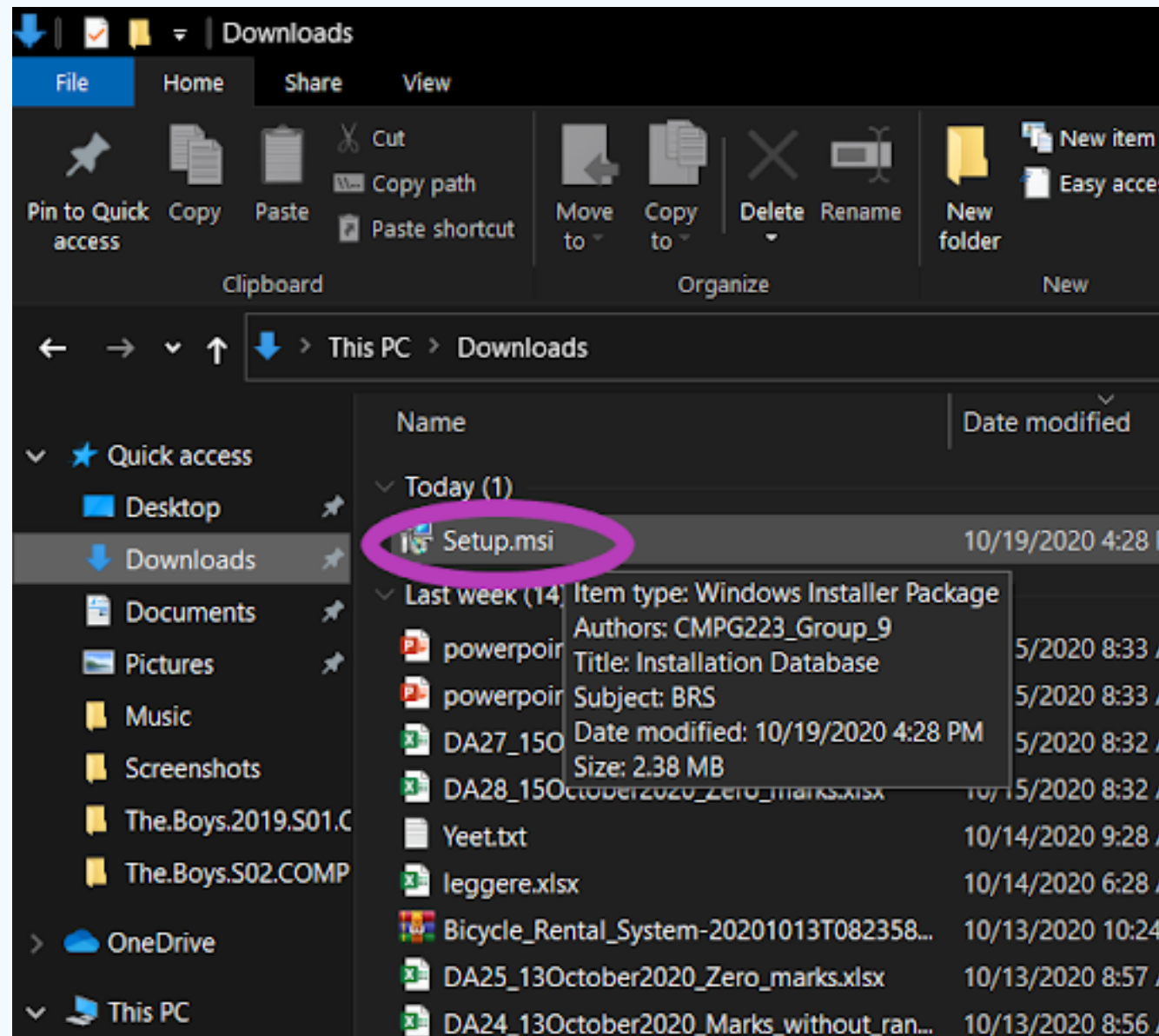
Student Number	Model	Employee Number	Time Rented
00000001	Giant	2	0 Days, 0 Hours, 1 Minutes
00000005	Bianchi	2	0 Days, 0 Hours, 7 Minutes
00000020	Cannodale	2	0 Days, 0 Hours, 4 Minutes
00000011	Blade	2	0 Days, 0 Hours, 2 Minutes
00000018	Colnago	2	0 Days, 0 Hours, 6 Minutes
00000001	Fuji	2	0 Days, 0 Hours, 5 Minutes
00000007	BMX	2	0 Days, 0 Hours, 1 Minutes
00000017	Kona20	2	0 Days, 0 Hours, 4 Minutes
00000002	Triban	2	0 Days, 0 Hours, 2 Minutes
00000011	Kona20	2	0 Days, 0 Hours, 1 Minutes

REPORTS CONT

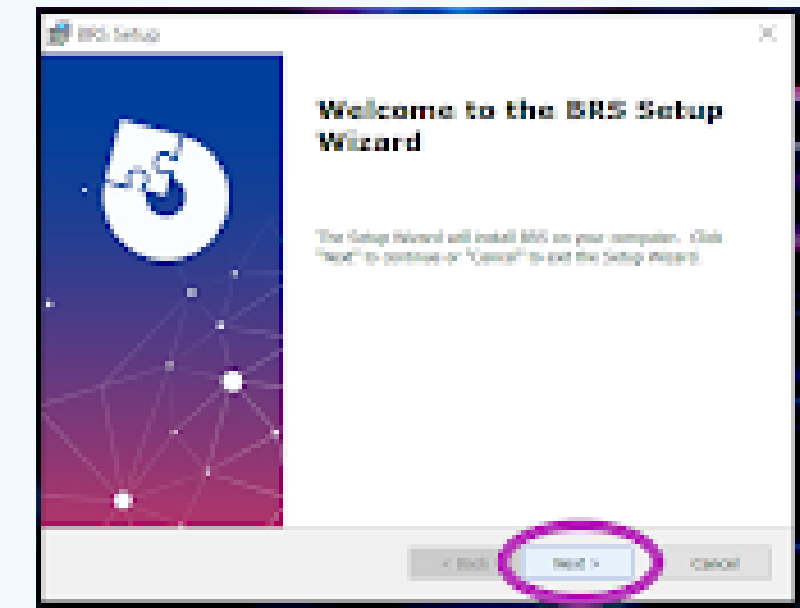


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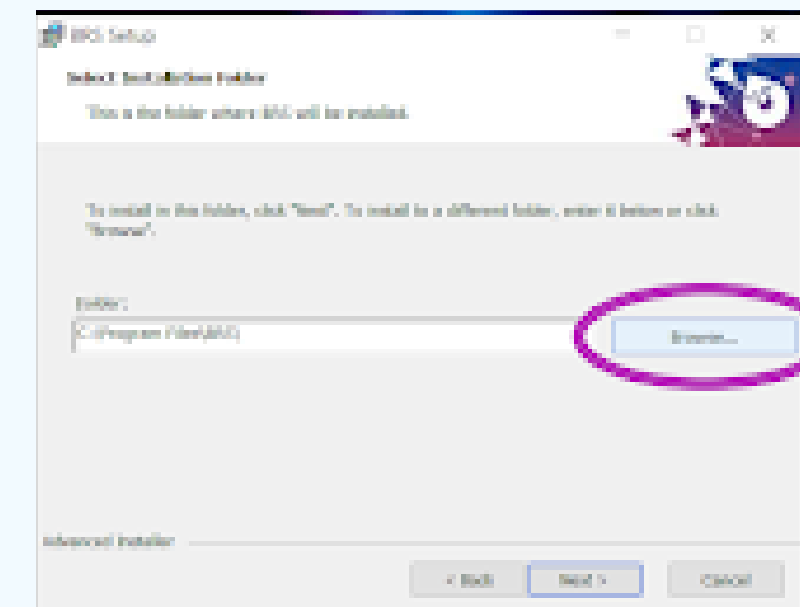
1)



2)

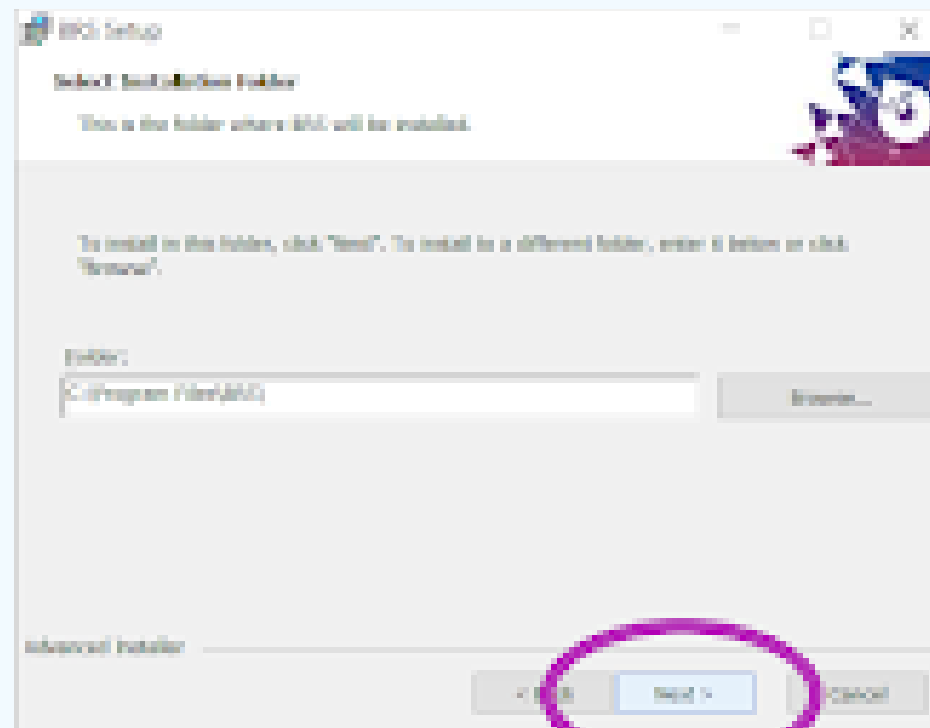


3)

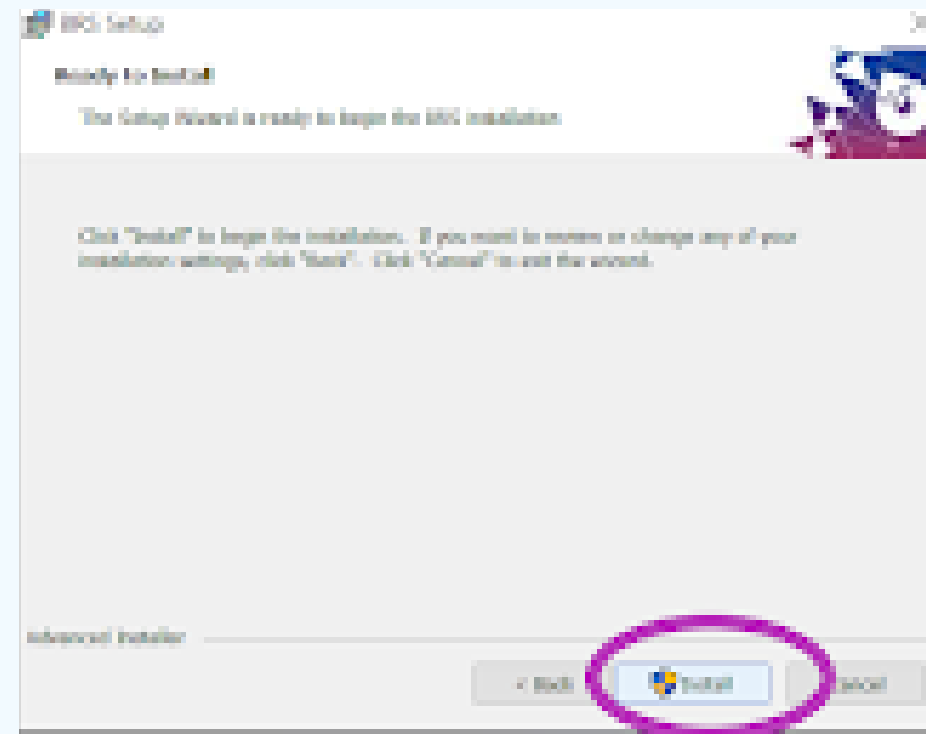


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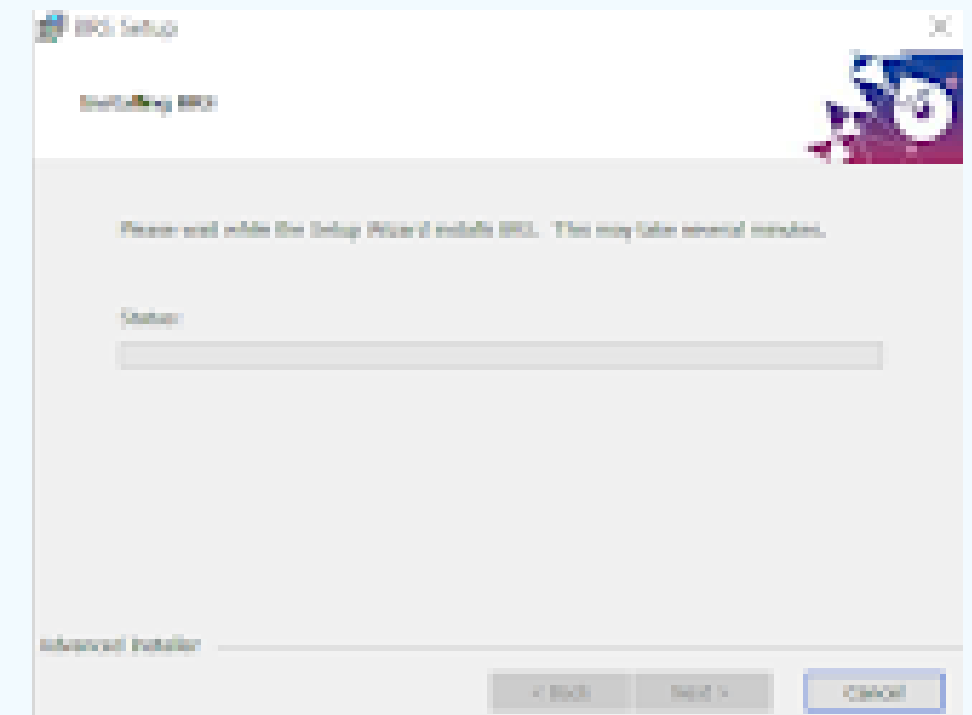
4)



5)

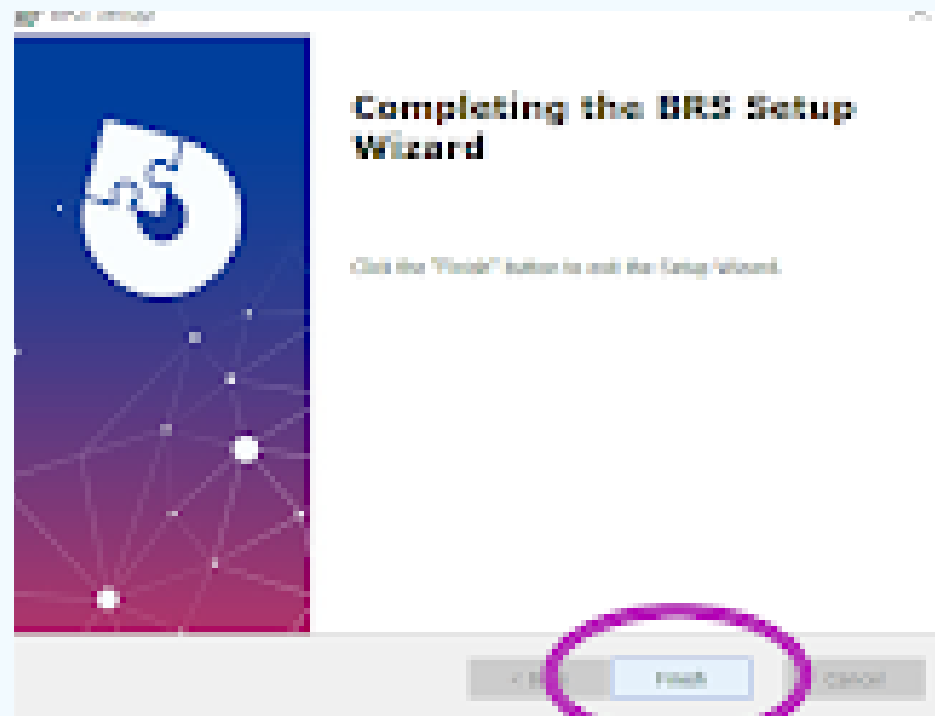


6)

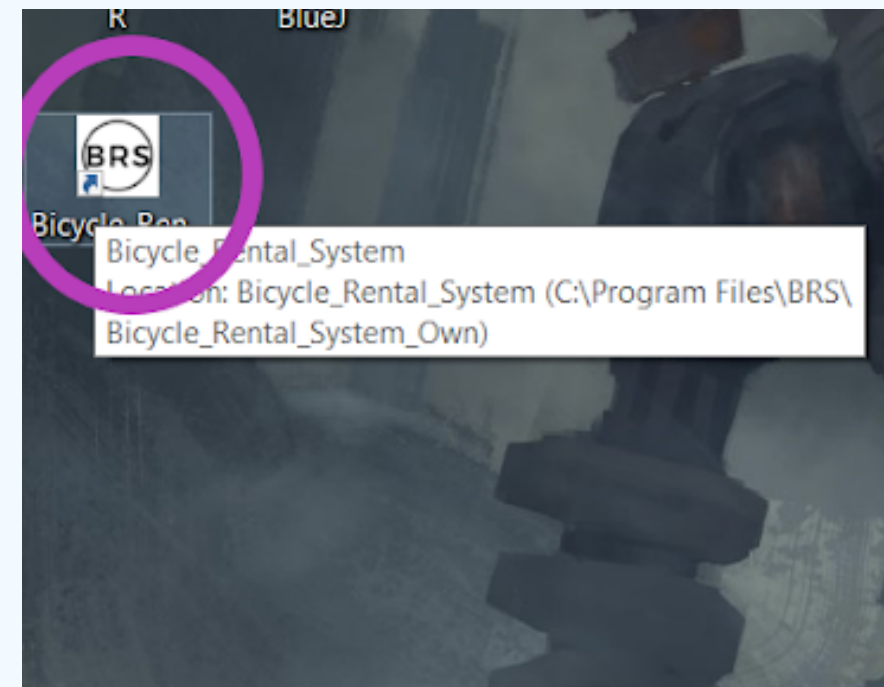


User Manual

7)



8)



SYSTEM DEMONSTRATION

GROUP 09 MEMBERS

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