

**Федеральное государственное образовательное бюджетное
учреждение высшего образования
«Финансовый университет при Правительстве Российской Федерации»
(Финансовый университет)**

Колледж информатики и программирования


ОТЧЁТ
По учебной практике

Специальность 09.02.07 «Информационные системы и программирование»
(код) (наименование)

Профессиональный модуль ПМ.02 Осуществление интеграции программных модулей
(код) (наименование)

Междисциплинарный курс МДК.02.01 Технология разработки программного обеспечения
(код) (наименование)

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категория или звание,
должность)

Москва – 2024

Перечень работ, выполненных в ходе учебной практики

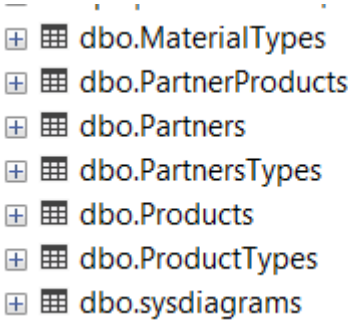
№ п/п	Виды работ	Оценка
1	Анализ выбранной предметной области	
2	Разработка и оформление технического задания на программное средство	
3	Построение архитектуры программного средства	
4	Анализ требований и построение необходимых диаграмм	

Оглавление

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Модуль 1 – Разработка, администрирование и защита баз данных

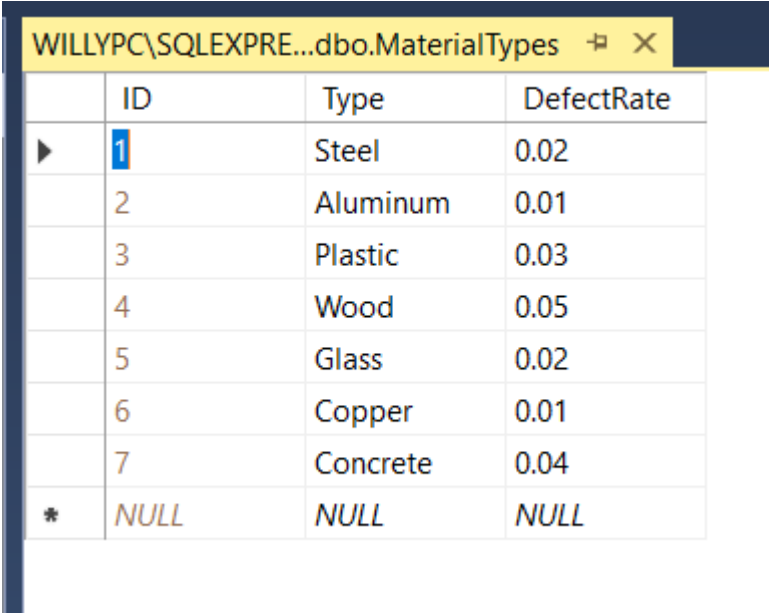
На рисунке 1 расположен список таблиц созданной базы данных:



+	dbo.MaterialTypes
+	dbo.PartnerProducts
+	dbo.Partners
+	dbo.PartnersTypes
+	dbo.Products
+	dbo.ProductTypes
+	dbo.sysdiagrams

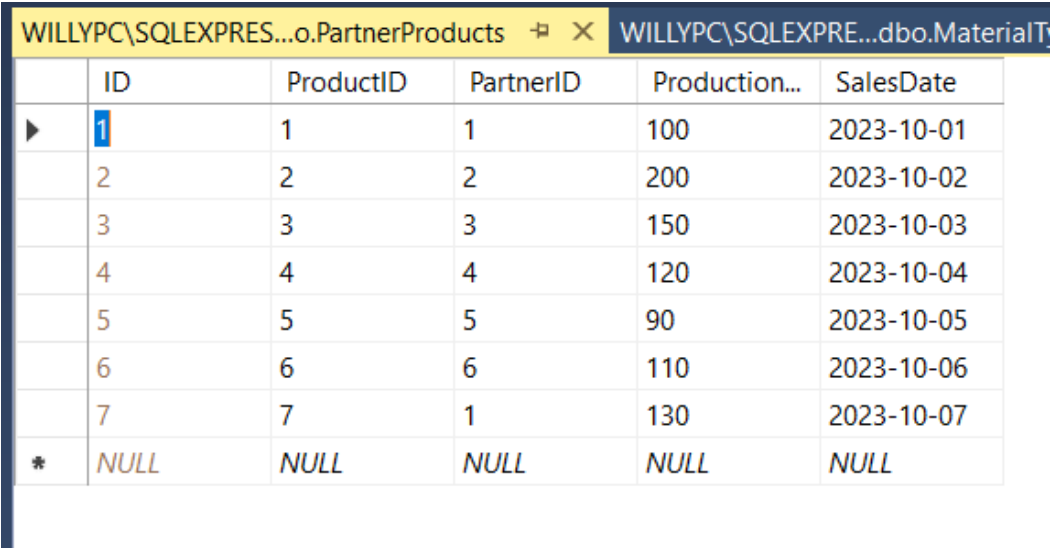
Рисунок 1 – таблицы базы данных

На рисунках 2-7 изображены заполненные данными таблицы.



WILLYPC\SQLEXPRES...dbo.MaterialTypes			
	ID	Type	DefectRate
▶	1	Steel	0.02
	2	Aluminum	0.01
	3	Plastic	0.03
	4	Wood	0.05
	5	Glass	0.02
	6	Copper	0.01
	7	Concrete	0.04
*	NULL	NULL	NULL

Рисунок 2 – таблица типов материалов



WILLYPC\SQLEXPRES...o.PartnerProducts					
	ID	ProductID	PartnerID	Production...	SalesDate
▶	1	1	1	100	2023-10-01
	2	2	2	200	2023-10-02
	3	3	3	150	2023-10-03
	4	4	4	120	2023-10-04
	5	5	5	90	2023-10-05
	6	6	6	110	2023-10-06
	7	7	1	130	2023-10-07
*	NULL	NULL	NULL	NULL	NULL

Рисунок 3 – таблица продуктов партнера

WILLYPC\SQLEXPRES...DB - dbo.Partners												
	ID	PartnerTyp...	PartnerNa...	DirectorFirs...	DirectorLas...	DirectorPat...	Email	Telephone...	LegalAddr...	INN	Rating	Discount
▶	1	1	ABC Steel Co.	Ivan	Ivanov	Ivanovich	contact@ab...	+7 123 456 ...	123 Main St,...	1234567890	11	0.00
	2	2	XYZ Distrib...	Petr	Petrov	Petrovich	info@xyzdis...	+7 234 567 ...	456 Elm St, ...	2345678901	4	0.00
	3	3	Retail Group	Svetlana	Svetlova	Svetlanovna	support@re...	+7 345 678 ...	789 Pine St, ...	3456789012	4.8	0.00
	4	4	Tech Manuf...	Oleg	Olegov	Olegovich	sales@tech...	+7 456 789 ...	321 Birch St,...	4567890123	4.6	0.00
	5	5	Wholesale ...	Anna	Ananova	Ananovna	info@whole...	+7 567 890 ...	654 Cedar S...	5678901234	4.3	0.00
	6	6	Service Solu...	Dmitry	Dmitriev	Dmitrievich	contact@se...	+7 678 901 ...	987 Maple ...	6789012345	4.7	0.00
	13	1	ООО во	ыфв	фыфв	ыфв	ajshas@ash...	3247243987	ывывыв	NULL	2	NULL
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Рисунок 4 – таблица партнёров

WILLYPC\SQLEXPRES...dbo.PartnersTypes		
	ID	PartnerTypeName
▶	1	Supplier
	2	Distributor
	3	Retailer
	4	Manufacturer
	5	Wholesaler
	6	Service Provider
*	NULL	NULL

Рисунок 5 – таблица типов партнёров

	ID	TypeID	ProductName	Article	MinCost	MaterialTy...
▶	1	1	Steel Beam	SB-001	150.00	1
	2	2	Aluminum Sheet	AS-002	75.50	2
	3	1	Plastic Pipe	PP-003	25.00	3
	4	3	Wooden Plank	WP-004	40.00	4
	5	2	Glass Panel	GP-005	100.00	5
	6	4	Copper Wire	CW-006	50.00	6
	7	1	Concrete Block	CB-007	30.00	7
*	NULL	NULL	NULL	NULL	NULL	NULL

Рисунок 6 – таблица продуктов

VILLYPC\SQLXPRES...dbo.ProductTypes				WILLYPC\SQLXP
	ID	Type	Coefficient	
	1	Raw Material	1	
	2	Finished Product	1.5	
	3	Packaging	0.8	
	4	Component	1.2	
	5	Accessory	0.9	
	6	Spare Part	1.3	
*	NULL	NULL	NULL	

Рисунок 7 – таблица типов продуктов

В листинге 1 представлен скрипт создания базы данных.

Листинг 1 – скрипт базы данных

```
USE [master]
GO
CREATE DATABASE [ProductionDB]
    CONTAINMENT = NONE
    ON PRIMARY
    ( NAME = N'ProductionDB', FILENAME = N'C:\Program Files\Microsoft SQL
Server\MSSQL15.SQLEXPRESS\MSSQL\DATA\ProductionDB.mdf' , SIZE = 8192KB ,
MAXSIZE = UNLIMITED, FILEGROWTH = 65536KB )
    LOG ON
    ( NAME = N'ProductionDB_log', FILENAME = N'C:\Program Files\Microsoft SQL
Server\MSSQL15.SQLEXPRESS\MSSQL\DATA\ProductionDB_log.ldf' , SIZE = 8192KB ,
MAXSIZE = 2048GB , FILEGROWTH = 65536KB )
    WITH CATALOG_COLLATION = DATABASE_DEFAULT
GO
ALTER DATABASE [ProductionDB] SET COMPATIBILITY_LEVEL = 150
GO
IF (1 = FULLTEXTSERVICEPROPERTY('IsFullTextInstalled'))
begin
EXEC [ProductionDB].[dbo].[sp_fulltext_database] @action = 'enable'
end
GO
ALTER DATABASE [ProductionDB] SET ANSI_NULL_DEFAULT OFF
GO
ALTER DATABASE [ProductionDB] SET ANSI_NULLS OFF
GO
ALTER DATABASE [ProductionDB] SET ANSI_PADDING OFF
GO
ALTER DATABASE [ProductionDB] SET ANSI_WARNINGS OFF
GO
ALTER DATABASE [ProductionDB] SET ARITHABORT OFF
GO
ALTER DATABASE [ProductionDB] SET AUTO_CLOSE ON
GO
ALTER DATABASE [ProductionDB] SET AUTO_SHRINK OFF
GO
ALTER DATABASE [ProductionDB] SET AUTO_UPDATE_STATISTICS ON
GO
ALTER DATABASE [ProductionDB] SET CURSOR_CLOSE_ON_COMMIT OFF
GO
ALTER DATABASE [ProductionDB] SET CURSOR_DEFAULT GLOBAL
```

```

GO
ALTER DATABASE [ProductionDB] SET CONCAT_NULL_YIELDS_NULL OFF
GO
ALTER DATABASE [ProductionDB] SET NUMERIC_ROUNDABORT OFF
GO
ALTER DATABASE [ProductionDB] SET QUOTED_IDENTIFIER OFF
GO
ALTER DATABASE [ProductionDB] SET RECURSIVE_TRIGGERS OFF
GO
ALTER DATABASE [ProductionDB] SET  ENABLE_BROKER
GO
ALTER DATABASE [ProductionDB] SET AUTO_UPDATE_STATISTICS_ASYNC OFF
GO
ALTER DATABASE [ProductionDB] SET DATE_CORRELATION_OPTIMIZATION OFF
GO
ALTER DATABASE [ProductionDB] SET TRUSTWORTHY OFF
GO
ALTER DATABASE [ProductionDB] SET ALLOW_SNAPSHOT_ISOLATION OFF
GO
ALTER DATABASE [ProductionDB] SET PARAMETERIZATION SIMPLE
GO
ALTER DATABASE [ProductionDB] SET READ_COMMITTED_SNAPSHOT OFF
GO
ALTER DATABASE [ProductionDB] SET HONOR_BROKER_PRIORITY OFF
GO
ALTER DATABASE [ProductionDB] SET RECOVERY SIMPLE
GO
ALTER DATABASE [ProductionDB] SET  MULTI_USER
GO
ALTER DATABASE [ProductionDB] SET PAGE_VERIFY CHECKSUM
GO
ALTER DATABASE [ProductionDB] SET DB_CHAINING OFF
GO
ALTER DATABASE [ProductionDB] SET FILESTREAM( NON_TRANSACTED_ACCESS = OFF )
GO
ALTER DATABASE [ProductionDB] SET TARGET_RECOVERY_TIME = 60 SECONDS
GO
ALTER DATABASE [ProductionDB] SET DELAYED_DURABILITY = DISABLED
GO
ALTER DATABASE [ProductionDB] SET ACCELERATED_DATABASE_RECOVERY = OFF
GO
ALTER DATABASE [ProductionDB] SET QUERY_STORE = OFF
GO
USE [ProductionDB]
GO
/***** Object:  User [user1]      Script Date: 1/13/2025 10:42:58 AM *****/
CREATE USER [user1] FOR LOGIN [user1] WITH DEFAULT_SCHEMA=[dbo]
GO
/***** Object:  Table [dbo].[MaterialTypes]      Script Date: 1/13/2025
10:42:58 AM *****/
SET ANSI_NULLS ON
GO
SET QUOTED_IDENTIFIER ON
GO
CREATE TABLE [dbo].[MaterialTypes](
    [ID] [int] IDENTITY(1,1) NOT NULL,
    [Type] [nvarchar](50) NOT NULL,
    [DefectRate] [float] NOT NULL,
PRIMARY KEY CLUSTERED
(
    [ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY =
OFF) ON [PRIMARY]

```

```

) ON [PRIMARY]
GO
/***** Object: Table [dbo].[PartnerProducts]      Script Date: 1/13/2025
10:42:58 AM *****/
SET ANSI_NULLS ON
GO
SET QUOTED_IDENTIFIER ON
GO
CREATE TABLE [dbo].[PartnerProducts](
    [ID] [int] IDENTITY(1,1) NOT NULL,
    [ProductID] [int] NOT NULL,
    [PartnerID] [int] NOT NULL,
    [ProductionCount] [int] NOT NULL,
    [SalesDate] [date] NOT NULL,
PRIMARY KEY CLUSTERED
(
    [ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY =
OFF) ON [PRIMARY]
) ON [PRIMARY]
GO
/***** Object: Table [dbo].[Partners]      Script Date: 1/13/2025 10:42:58 AM
*****/
SET ANSI_NULLS ON
GO
SET QUOTED_IDENTIFIER ON
GO
CREATE TABLE [dbo].[Partners](
    [ID] [int] IDENTITY(1,1) NOT NULL,
    [PartnerTypeID] [int] NOT NULL,
    [PartnerName] [nvarchar](100) NOT NULL,
    [DirectorFirstName] [nvarchar](50) NULL,
    [DirectorLastName] [nvarchar](50) NULL,
    [DirectorPatronymic] [nvarchar](50) NULL,
    [Email] [nvarchar](100) NULL,
    [TelephoneNumber] [nvarchar](20) NULL,
    [LegalAddress] [nvarchar](200) NULL,
    [INN] [nvarchar](20) NULL,
    [Rating] [float] NULL,
    [Discount] [decimal](5, 2) NULL,
PRIMARY KEY CLUSTERED
(
    [ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY =
OFF) ON [PRIMARY]
) ON [PRIMARY]
GO
/***** Object: Table [dbo].[PartnersTypes]      Script Date: 1/13/2025
10:42:58 AM *****/
SET ANSI_NULLS ON
GO
SET QUOTED_IDENTIFIER ON
GO
CREATE TABLE [dbo].[PartnersTypes](
    [ID] [int] IDENTITY(1,1) NOT NULL,
    [PartnerTypeName] [nvarchar](50) NOT NULL,
PRIMARY KEY CLUSTERED
(
    [ID] ASC
)WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY =
OFF) ON [PRIMARY]

```



```

) ON [PRIMARY]
GO
/***** Object: Table [dbo].[Products]      Script Date: 1/13/2025 10:42:58 AM
*****/
SET ANSI_NULLS ON
GO
SET QUOTED_IDENTIFIER ON
GO
CREATE TABLE [dbo].[Products] (
    [ID] [int] IDENTITY(1,1) NOT NULL,
    [TypeID] [int] NOT NULL,
    [ProductName] [nvarchar](100) NOT NULL,
    [Article] [nvarchar](50) NOT NULL,
    [MinCost] [decimal](18, 2) NOT NULL,
    [MaterialTypeID] [int] NULL,
    PRIMARY KEY CLUSTERED
    (
        [ID] ASC
    )WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
    ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY =
    OFF) ON [PRIMARY]
) ON [PRIMARY]
GO
/***** Object: Table [dbo].[ProductTypes]      Script Date: 1/13/2025
10:42:58 AM *****/
SET ANSI_NULLS ON
GO
SET QUOTED_IDENTIFIER ON
GO
CREATE TABLE [dbo].[ProductTypes] (
    [ID] [int] IDENTITY(1,1) NOT NULL,
    [Type] [nvarchar](50) NOT NULL,
    [Coefficient] [float] NOT NULL,
    PRIMARY KEY CLUSTERED
    (
        [ID] ASC
    )WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
    ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY =
    OFF) ON [PRIMARY]
) ON [PRIMARY]
GO
/***** Object: Table [dbo].[sysdiagrams]      Script Date: 1/13/2025 10:42:58
AM *****/
SET ANSI_NULLS ON
GO
SET QUOTED_IDENTIFIER ON
GO
CREATE TABLE [dbo].[sysdiagrams] (
    [name] [nvarchar](128) NOT NULL,
    [principal_id] [int] NOT NULL,
    [diagram_id] [int] IDENTITY(1,1) NOT NULL,
    [version] [int] NULL,
    [definition] [varbinary](max) NULL,
    PRIMARY KEY CLUSTERED
    (
        [diagram_id] ASC
    )WITH (PAD_INDEX = OFF, STATISTICS_NORECOMPUTE = OFF, IGNORE_DUP_KEY = OFF,
    ALLOW_ROW_LOCKS = ON, ALLOW_PAGE_LOCKS = ON, OPTIMIZE_FOR_SEQUENTIAL_KEY =
    OFF) ON [PRIMARY]
) ON [PRIMARY] TEXTIMAGE_ON [PRIMARY]
GO
ALTER TABLE [dbo].[PartnerProducts] WITH CHECK ADD CONSTRAINT
[FK_PartnerProducts_Partners] FOREIGN KEY([PartnerID])
REFERENCES [dbo].[Partners] ([ID])

```

```

GO
ALTER TABLE [dbo].[PartnerProducts] CHECK CONSTRAINT
[FK_PartnerProducts_Partners]
GO
ALTER TABLE [dbo].[PartnerProducts] WITH CHECK ADD CONSTRAINT
[FK_PartnerProducts_Products] FOREIGN KEY([ProductID])
REFERENCES [dbo].[Products] ([ID])
GO
ALTER TABLE [dbo].[PartnerProducts] CHECK CONSTRAINT
[FK_PartnerProducts_Products]
GO
ALTER TABLE [dbo].[Partners] WITH CHECK ADD CONSTRAINT
[FK_Partners_PartnersTypes] FOREIGN KEY([PartnerTypeID])
REFERENCES [dbo].[PartnersTypes] ([ID])
GO
ALTER TABLE [dbo].[Partners] CHECK CONSTRAINT [FK_Partners_PartnersTypes]
GO
ALTER TABLE [dbo].[Products] WITH CHECK ADD CONSTRAINT
[FK_Products_MaterialTypes] FOREIGN KEY([MaterialTypeID])
REFERENCES [dbo].[MaterialTypes] ([ID])
GO
ALTER TABLE [dbo].[Products] CHECK CONSTRAINT [FK_Products_MaterialTypes]
GO
ALTER TABLE [dbo].[Products] WITH CHECK ADD CONSTRAINT
[FK_Products_ProductTypes] FOREIGN KEY([TypeID])
REFERENCES [dbo].[ProductTypes] ([ID])
GO
ALTER TABLE [dbo].[Products] CHECK CONSTRAINT [FK_Products_ProductTypes]
GO
USE [master]
GO
ALTER DATABASE [ProductionDB] SET READ_WRITE
GO

```

Модуль 2 – Разработка модулей программного обеспечения для компьютерных систем

В листинге 2 представлена разметка окна MainWindow

Листинг 2 - разметка окна MainWindow

```

<Window x:Class="MartoyanWGUP2.MainWindow"
    xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
    xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
    xmlns:d="http://schemas.microsoft.com/expression/blend/2008"
    xmlns:mc="http://schemas.openxmlformats.org/markup-
compatibility/2006"
    xmlns:local="clr-namespace:MartoyanWGUP2"
    mc:Ignorable="d"
    Title="Martoyan" Height="450" Width="800">
    <Grid>
        <Grid.RowDefinitions>
            <RowDefinition Height="40"/>

```

```

        <RowDefinition/>
    </Grid.RowDefinitions>
    <Button x:Name="Back" Grid.Row="0" Content="Назад"
VerticalAlignment="Center" HorizontalAlignment="Left" Margin="5,0,0,0"
Click="Back_Click"/>
    <Frame x:Name="Partners" Grid.Row="1" NavigationUIVisibility="Hidden"
Navigated="Partners_Navigated"/>
    <Image HorizontalAlignment="Right" Height="38" Margin="0,0,0,0"
VerticalAlignment="Top" Width="38" Grid.Row="0" Source =
"Resources/MasterPol.png"/>
</Grid>
</Window>

```

В листинге 3 представлен код окна MainWindow.

Листинг 3 - код окна MainWindow

```

using MartoyanWGUP2.Classes;
using System.Windows;
using System.Windows.Controls;
using System.Windows.Navigation;

namespace MartoyanWGUP2
{
    public partial class MainWindow : Window
    {
        public MainWindow()
        {
            InitializeComponent();
            Partners.NavigationService.Navigate(new Pages.PartnerListPage());
            ProductionClass pc = new ProductionClass();
        }

        private void Back_Click(object sender, RoutedEventArgs e)
        {
            if (Partners.CanGoBack) Partners.GoBack();
        }

        private void Partners_Navigated(object sender, NavigationEventArgs e)
        {
            if (!(e.Content is Page page)) return;
            Title = $"{page.Title}";
        }
    }
}

```

```

        if (page is Pages.AddPartnerPage)
            Back.Visibility = Visibility.Visible;
        else if (page is Pages.PartnerRealisationHistoryPage)
            Back.Visibility = Visibility.Visible;
        else
            Back.Visibility = Visibility.Hidden;
    }
}
}

```

На рисунке 8 изображена страница списка партнёров.

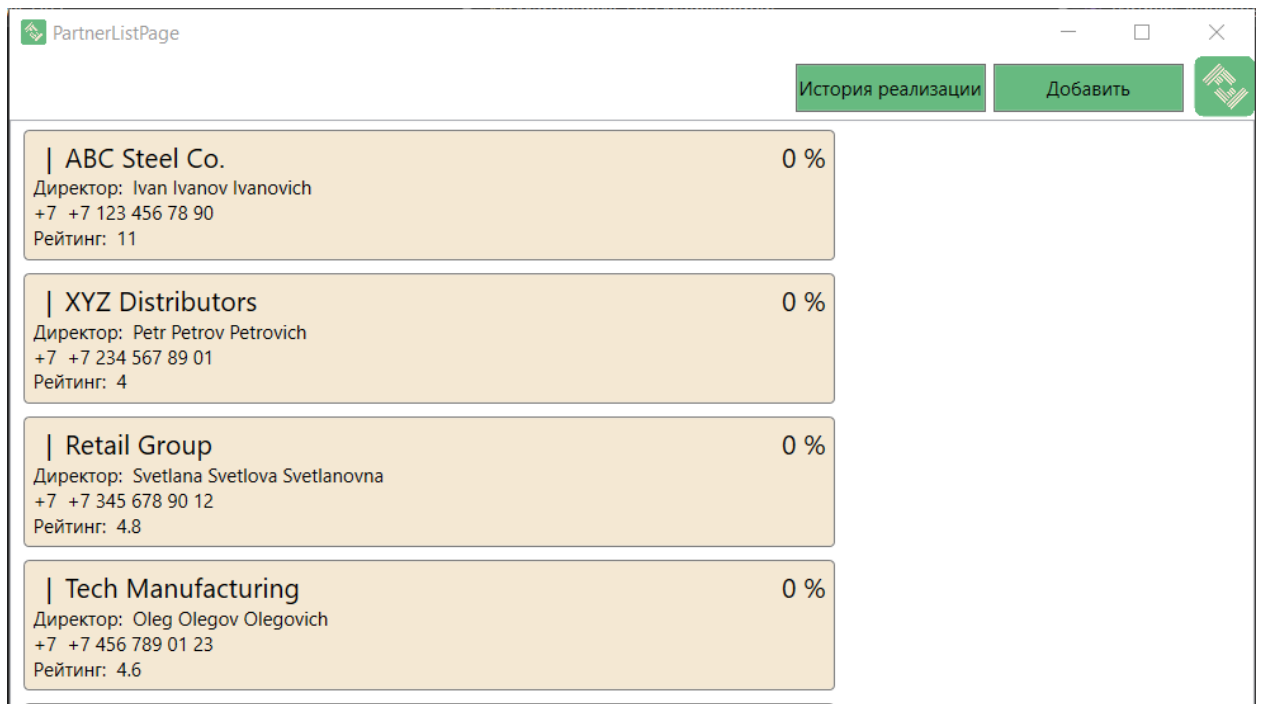


Рисунок 8 – страница партнёров

В листинге 4 представлена XAML-разметка страницы партнёров.

Листинг 4 – XAML-разметка страницы партнёров

```

<Page x:Class="MartoyanWGUP2.Pages.PartnerListPage"
    xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
    xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
    xmlns:mc="http://schemas.openxmlformats.org/markup-compatibility/2006"
    xmlns:d="http://schemas.microsoft.com/expression/blend/2008"
    xmlns:local="clr-namespace:MartoyanWGUP2.Pages"
    mc:Ignorable="d"
    d:DesignHeight="450" d:DesignWidth="800"
    Title="PartnerListPage">

```

```

<Grid>
    <Button x:Name="AddButton" Grid.Row="0" Content="Добавить"
VerticalAlignment="Top" HorizontalAlignment="Right" Margin="0,-35,45,0"
Click="AddButton_Click"/>
    <Button x:Name="RealizationHystoryButton" Grid.Row="0"
Content="История реализации" VerticalAlignment="Top"
HorizontalAlignment="Right" Margin="0,-35,170,0"
Click="RealizationHystoryButton_Click"/>
    <ListView x:Name="PartnersList"
ScrollViewer.VerticalScrollBarVisibility = "Hidden">
        <ListView.ItemContainerStyle>
            <Style TargetType="ListViewItem">
                <EventSetter Event="MouseDoubleClick"
Handler="ListViewItem_MouseDoubleClick"/>
            </Style>
        </ListView.ItemContainerStyle>
        <ListView.ItemTemplate>
            <DataTemplate>
                <Border BorderThickness="1" BorderBrush="Gray" Margin="2"
Padding="5" CornerRadius="3" Background="#F4E8D3">
                    <Grid Style="{StaticResource parList}">
                        <Grid.ColumnDefinitions>
                            <ColumnDefinition Width="10*"/>
                            <ColumnDefinition Width="1*"/>
                        </Grid.ColumnDefinitions>

                        <StackPanel Grid.Column="0" Margin="0,0,0,0">
                            <TextBlock>
                                <Run Text="{Binding
PartnersTypes.PartnerTypeName}" FontSize="17"/>
                                <Run Text=" | " FontSize="17"/>
                                <Run Text="{Binding PartnerName}" FontSize="17"/>
                            </TextBlock>
                            <TextBlock>
                                <Run Text="Директор: "/>
                                <Run Text="{Binding DirectorFirstName}"/>
                                <Run Text="{Binding DirectorLastName}"/>
                                <Run Text="{Binding DirectorPatronymic}"/>
                            </TextBlock>
                            <TextBlock>
                                <Run Text="+7 "/>
                                <Run Text="{Binding TelephoneNumber}"/>
                            </TextBlock>

```

```

        <TextBlock>
        <Run Text="Рейтинг: "/>
        <Run Text="{Binding Rating}"/>
        </TextBlock>
    </StackPanel>
    <TextBlock Grid.Column="1"
VerticalAlignment="Top" HorizontalAlignment="Right" FontSize="17">
        <Run Text="{Binding Discount,
TargetNullValue='0'}"/>
        <Run Text="%" />
    </TextBlock>
</Grid>
</Border>
</DataTemplate>
</ListView.ItemTemplate>
</ListView>
</Grid>
</Page>

```

На рисунке 9 расположен метод для расчёта скидки для партнёров.

```

}
private void CountDiscountByPartners()
{
    var partnerSales = _context.PartnerProducts
        .GroupBy(x => x.PartnerID)
        .Select(group => new
        {
            PartnerId = group.Key,
            TotalSales = group.Sum(p => p.ProductionCount)
        })
        .ToList();

    foreach (var partner in _context.Partners)
    {
        var salesData = partnerSales.FirstOrDefault(ps => ps.PartnerId == partner.ID);
        if (salesData != null)
        {
            if (salesData.TotalSales < 10000)
            {
                partner.Discount = 0;
            }
            else if (salesData.TotalSales >= 10000 && salesData.TotalSales < 50000)
            {
                partner.Discount = 5;
            }
            else if (salesData.TotalSales >= 50000 && salesData.TotalSales < 300000)
            {
                partner.Discount = 10;
            }
            else partner.Discount = 15;
        }
    }
    _context.SaveChanges();
}
}

```

Рисунок 9 – метод расчёта скидки для партнёра.

В листинге 5 представлен код страницы партнёров.

Листинг 5 - код страницы партнёров

```
using System.Collections.Generic;
using System.Linq;
using System.Windows;
using System.Windows.Controls;
using System.Windows.Input;
using System.Windows.Navigation;

namespace MartoyanWGUP2.Pages
{
    public partial class PartnerListPage : Page
    {
        ProductionDBEntities _context = ProductionDBEntities.GetContext();
        public PartnerListPage()
        {
            InitializeComponent();
            PartnersList.ItemsSource =
ProductionDBEntities.GetContext().Partners.ToList();
            CountDiscountByPartners();
        }
        private void CountDiscountByPartners()
        {
            var partnerSales = _context.PartnerProducts
                .GroupBy(x => x.PartnerID)
                .Select(group => new
                {
                    PartnerId = group.Key,
                    TotalSales = group.Sum(p => p.ProductionCount)
                })
                .ToList();

            foreach (var partner in _context.Partners)
            {
                var salesData = partnerSales.FirstOrDefault(ps =>
ps.PartnerId == partner.ID);
                if (salesData != null)
                {
                    if (salesData.TotalSales < 10000)
                    {
                        partner.Discount = 0;
                    }
                }
            }
        }
    }
}
```

```

        else if (salesData.TotalSales >= 10000 &&
salesData.TotalSales < 50000)
        {
            partner.Discount = 5;
        }
        else if (salesData.TotalSales >= 50000 &&
salesData.TotalSales < 300000)
        {
            partner.Discount = 10;
        }
        else partner.Discount = 15;
    }
}
_context.SaveChanges();
}

private void ListViewItem_MouseDoubleClick(object sender,
MouseButtonEventArgs e)
{
    if (PartnersList.SelectedItem is Partner partner)
    {
        NavigationService.Navigate(new AddPartnerPage(partner));
    }
}

private void RealizationHystoryButton_Click(object sender,
RoutedEventArgs e)
{
    List<Partner> partners =
PartnersList.SelectedItems.Cast<Partner>().ToList();
    if (partners.Count > 1)
    {
        MessageBox.Show("Выберите только одного партнера!",
"Внимание");
    }
    else if (partners.Count == 0) MessageBox.Show("Выберите
партнера!", "Внимание");
    else NavigationService?.Navigate(new
PartnerRealisationHistoryPage(partners[0]));
}

private void AddButton_Click(object sender, RoutedEventArgs e)
{

```



```

        AddPartnerPage addpage = new AddPartnerPage(null);
        NavigationService?.Navigate(addpage);

        addpage.OnPartnerAdded += (newPartner) =>
        {
            var list = _context.Partners.ToList();
            list.Add(newPartner);
            PartnersList.ItemsSource = list;
        };
    }

    private void Button_Click(object sender, RoutedEventArgs e)
    {
        Button button = (Button)sender;
        Partner partners = (Partner)button.DataContext;
        NavigationService?.Navigate(new
PartnerRealisationHistoryPage(partners));
    }
}
}

```

На листинге 5 можно увидеть код словаря стилей приложения

Листинг 5 – словарь стилей приложения

```

<ResourceDictionary
xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
    xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml">

    <Style TargetType="Button">
        <Setter Property="Width" Value="120"/>
        <Setter Property="Height" Value="30"/>
        <Setter Property="Background" Value="#67BA80"/>
    </Style>

    <Style TargetType="StackPanel">
        <Setter Property="Background" Value="#F4E8D3"/>
        <Setter Property="Width" Value="500"/>
    </Style>

    <Style TargetType="ListViewItem">
        <Setter Property="Height" Value="200"/>
        <Setter Property="Padding" Value="3"/>
        <Setter Property="HorizontalContentAlignment" Value="Left" />
    </Style>

```

```

</Style>

<Style x:Key="AddPageTextBlock" TargetType="TextBlock">
    <Setter Property="VerticalAlignment" Value="Center"/>
    <Setter Property="HorizontalAlignment" Value="Center"/>
</Style>

<Style TargetType="TextBox">
    <Setter Property="Width" Value="200"/>
    <Setter Property="Height" Value="30"/>
</Style>

<Style TargetType="Grid">
    <Setter Property="Background" Value="#FFFFFF"/>
</Style>

<Style TargetType="Grid" x:Key="parList">
    <Setter Property="Background" Value="#F4E8D3"/>
    <Setter Property="Width" Value="500"/>
</Style>

<Style TargetType="DataGridCell">
    <Setter Property="Background" Value="#F4E8D3"/>
</Style>

<Style TargetType="DataGrid">
    <Setter Property="AutoGenerateColumns" Value="False"/>
    <Setter Property="IsReadOnly" Value="True"/>
</Style>
</ResourceDictionary>

```

Модуль 3 – Сопровождение и обслуживание программного обеспечения компьютерных систем

На рисунке 10 расположена разметка окна добавления партнёра.

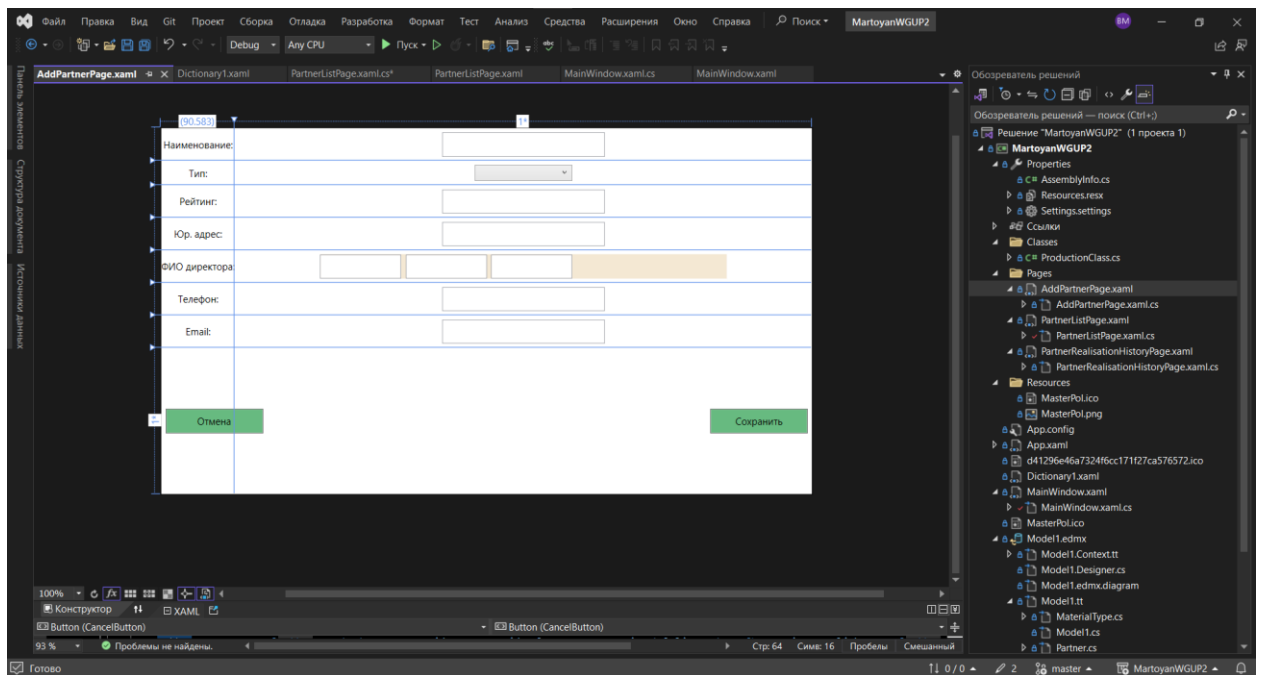


Рисунок 10 – разметка окна добавления партнёра

В листинге 7 представлена разметка окна добавления партнёра.

Листинг 7 - разметка окна добавления партнёра.

```
<Page x:Class="MartoyanWGUP2.Pages.AddPartnerPage"
      xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
      xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
      xmlns:mc="http://schemas.openxmlformats.org/markup-compatibility/2006"
      xmlns:d="http://schemas.microsoft.com/expression/blend/2008"
      xmlns:local="clr-namespace:MartoyanWGUP2.Pages"
      mc:Ignorable="d"
      d:DesignHeight="450" d:DesignWidth="800"
      Title="AddPartnerPage">

    <Grid>

        <!-- Определение строк и столбцов -->
        <Grid.RowDefinitions>

            <RowDefinition Height="Auto"/>
            <RowDefinition Height="Auto"/>
            <RowDefinition Height="Auto"/>
            <RowDefinition Height="Auto"/>
            <RowDefinition Height="Auto"/>
            <RowDefinition Height="Auto"/>
            <RowDefinition Height="Auto"/>
            <RowDefinition Height="*/>

        </Grid.RowDefinitions>

        <Grid.ColumnDefinitions>
```

```

        <ColumnDefinition Width="Auto"/>
        <ColumnDefinition Width="*/>
    </Grid.ColumnDefinitions>

    <!-- Наименование -->
    <TextBlock Text="Наименование:" Style="{StaticResource
AddPageTextBlock}" VerticalAlignment="Center"/>
    <TextBox x:Name="PartnerName" ToolTip="Наименование партнёра"
Text="{Binding PartnerName}" Grid.Column="1" Margin="5"/>

    <!-- Тип -->
    <TextBlock Text="Тип:" Grid.Row="1" Style="{StaticResource
AddPageTextBlock}" VerticalAlignment="Center"/>
    <ComboBox x:Name="PartnerType" Grid.Column="1" Grid.Row="1"
Height="20" Width="120"
        DisplayMemberPath="PartnerTypeName"
        SelectedValuePath="ID"
        SelectedValue="{Binding PartnerTypeID}" Margin="5"/>

    <!-- Рейтинг -->
    <TextBlock Text="Рейтинг:" Grid.Row="2" Style="{StaticResource
AddPageTextBlock}" VerticalAlignment="Center"/>
    <TextBox x:Name="PartnerRate" ToolTip="Рейтинг партнёра"
Grid.Column="1" Grid.Row="2" Text="{Binding Rating}"
PreviewTextInput="PartnerRate_PreviewTextInput" Margin="5"/>

    <!-- Юр. адрес -->
    <TextBlock Text="Юр. адрес:" Grid.Row="3" Style="{StaticResource
AddPageTextBlock}" VerticalAlignment="Center"/>
    <TextBox x:Name="PartnerAddress" ToolTip="Юридический адрес
организации" Grid.Column="1" Grid.Row="3" Text="{Binding LegalAddress}"
Margin="5"/>

    <!-- ФИО директора -->
    <TextBlock Text="ФИО директора:" Grid.Row="4" Style="{StaticResource
AddPageTextBlock}" VerticalAlignment="Center"/>
    <StackPanel Grid.Column="1" Grid.Row="4" Orientation="Horizontal"
Margin="5">
        <TextBox x:Name="DirectorSurname" ToolTip="Фамилия директора
организации" Width="100" Text="{Binding DirectorFirstName}"
Margin="0,0,5,0"/>
        <TextBox x:Name="DirectorName" ToolTip="Имя директора
организации" Width="100" Text="{Binding DirectorLastName}" Margin="0,0,5,0"/>
    </StackPanel>

```

```

        <TextBox x:Name="DirectorLastName" ToolTip="Отчество директора
организации" Width="100" Text="{Binding DirectorPatronymic}"/>
    </StackPanel>

    <!-- Телефон -->
    <TextBlock Text="Телефон:" Grid.Row="5" Style="{StaticResource
AddPageTextBlock}" VerticalAlignment="Center"/>
    <TextBox x:Name="PartnerPhone" ToolTip="Телефон организации"
Grid.Column="1" Grid.Row="5" Text="{Binding TelephoneNumber}"
PreviewTextInput="PartnerPhone_PreviewTextInput" Margin="5"/>

    <!-- Email -->
    <TextBlock Text="Email:" Grid.Row="6" Style="{StaticResource
AddPageTextBlock}" VerticalAlignment="Center"/>
    <TextBox x:Name="PartnerEmail" ToolTip="Адрес электронной почты"
Grid.Column="1" Grid.Row="6" Text="{Binding Email}" Margin="5"/>

    <!-- Кнопки -->
    <Button x:Name="CancelButton" Content="Отмена" Grid.Row="7"
Grid.ColumnSpan="2" HorizontalAlignment="Left" Margin="5"
Click="CancelButton_Click"/>
    <Button x:Name="SaveButton" Content="Сохранить" Grid.Row="7"
Grid.Column="1" HorizontalAlignment="Right" Margin="5"
Click="SaveButton_Click"/>
</Grid>
</Page>

```

На рисунке 11 отображена проверка на заполненность всех полей.

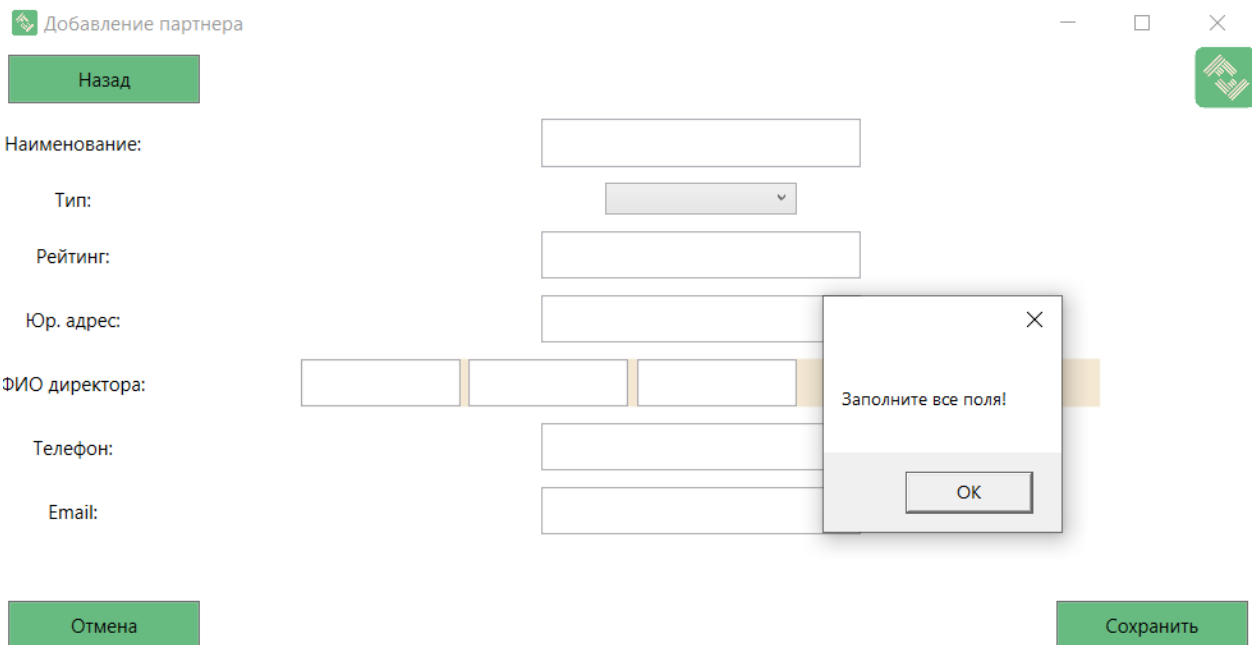


Рисунок 11 – сообщение о незаполненности полей

На рисунке 12 расположено сообщение об успешном сохранении данных.

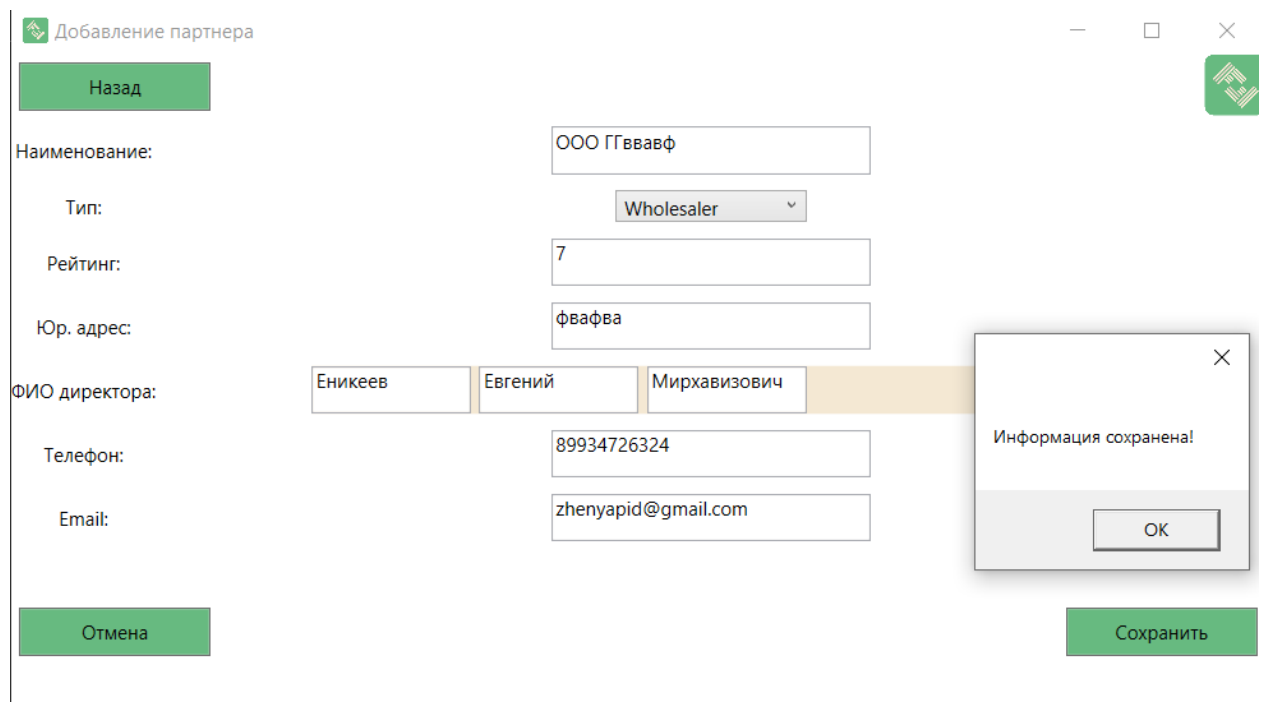


Рисунок 12 – сообщение об успешном сохранении данных

В листинге 8 представлен код окна добавления партнёра.

Листинг 8 – код окна добавления партнёра

```
using System;
using System.Linq;
using System.Windows;
using System.Windows.Controls;
```

```
using System.Windows.Input;
using System.Windows.Navigation;

namespace MartoyanWGUP2.Pages
{
    public partial class AddPartnerPage : Page
    {
        ProductionDBEntities db = ProductionDBEntities.GetContext();
        public event Action<Partner> OnPartnerAdded;

        Partner _currentpartner;
        public AddPartnerPage(Partner partner)
        {
            InitializeComponent();

            if (partner != null)
            {
                Title = "Редактирование партнера";
                _currentpartner = partner;
            }
            else
            {
                Title = "Добавление партнера";
                _currentpartner = new Partner();
            }

            PartnerType.ItemsSource = db.PartnersTypes.ToList();
            DataContext = _currentpartner;
        }

        private void CancelButton_Click(object sender, RoutedEventArgs e)
        {
            if (this.NavigationService.CanGoBack) NavigationService.GoBack();
        }

        private void SaveButton_Click(object sender, RoutedEventArgs e)
        {
            if (PartnerName.Text == null
                || PartnerType.SelectedIndex == -1
                || PartnerRate.Text == null
                || PartnerAddress.Text == null
```

```

        || DirectorSurname.Text == null
        || DirectorName.Text == null
        || DirectorLastName.Text == null
        || PartnerPhone.Text == null
        || PartnerEmail.Text == null)
    {
        MessageBox.Show("Заполните все поля!");
        return;
    }
    if (_currentpartner.ID == 0)
    {
        db.Partners.Add(_currentpartner);
        OnPartnerAdded.Invoke(_currentpartner);
    }
    try
    {
        db.SaveChanges();
        MessageBox.Show("Информация сохранена!");
        if (NavigationService.CanGoBack) NavigationService.GoBack();
    }
    catch (Exception ex)
    {
        MessageBox.Show(ex.Message.ToString());
    }
}

private void PartnerRate_PreviewTextInput(object sender,
TextCompositionEventArgs e)
{
    TextBox textBox = sender as TextBox;
    textBox.Text = textBox.Text.Replace(" ", string.Empty);
    textBox.SelectionStart = textBox.Text.Length;
    if (!IsValidInput(textBox.Text, e.Text[0]))
    {
        e.Handled = true;
    }
}

private void PartnerPhone_PreviewTextInput(object sender,
TextCompositionEventArgs e)
{
    TextBox textBox = sender as TextBox;
    if (!IsValidInputNumber(textBox.Text, e.Text[0]))

```



```

        {
            e.Handled = true;
        }
    }

    private bool IsValidInput(string text, char input)
    {
        if (!char.IsDigit(input))
            return false;

        if (text.Length > 1)
            return false;

        return true;
    }

    private bool IsValidInputNumber(string text, char input)
    {
        if (!char.IsDigit(input))
            return false;

        if (text.Length > 12)
            return false;

        return true;
    }
}
}

```

Модуль 4 – Осуществление интеграции программных модулей
 На рисунке 13 расположена разметка страницы продаж партнёров с привязкой столбцов к выборке из базы данных.

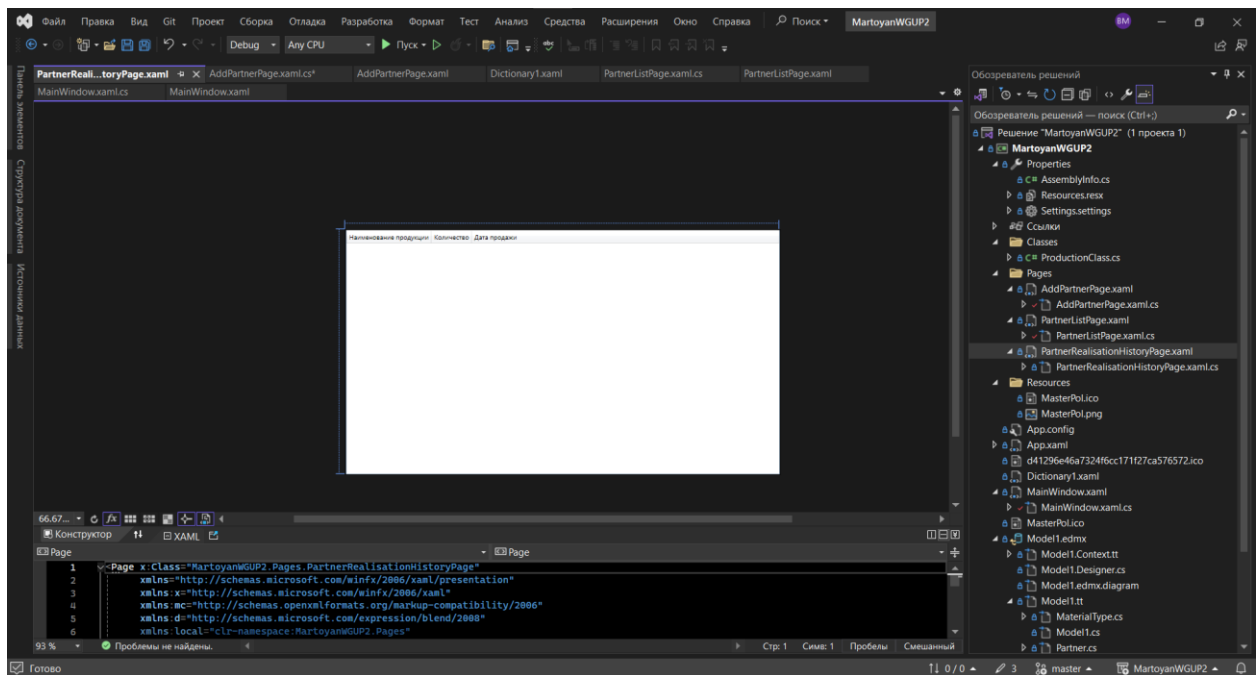


Рисунок 13 – разметка истории реализации партнёров

В листинге 9 представлена разметка страницы истории реализации партнёров.

Листинг 9 – разметка страницы истории реализации партнёров

```
<Page x:Class="MartoyanWGUP2.Pages.PartnerRealisationHistoryPage"
      xmlns="http://schemas.microsoft.com/winfx/2006/xaml/presentation"
      xmlns:x="http://schemas.microsoft.com/winfx/2006/xaml"
      xmlns:mc="http://schemas.openxmlformats.org/markup-compatibility/2006"
      xmlns:d="http://schemas.microsoft.com/expression/blend/2008"
      xmlns:local="clr-namespace:MartoyanWGUP2.Pages"
      mc:Ignorable="d"
      d:DesignHeight="450" d:DesignWidth="800"
      Title="PartnerRealisationHistoryPage">

    <Grid>

        <DataGrid x:Name="PartnerProductsDataGrid"
            HeadersVisibility="Column">

            <DataGrid.Columns>

                <DataGridTextColumn Header="Наименование продукции"
                    Binding="{Binding Product.ProductName}" Width="auto"/>

                <DataGridTextColumn Header="Количество" Binding="{Binding
                    ProductionCount}" Width="auto"/>

                <DataGridTextColumn Header="Дата продажи" Binding="{Binding
                    SalesDate}" Width="*" />

            </DataGrid.Columns>

        </DataGrid>

    </Grid>

</Page>
```

```
</Grid>
</Page>
```

На рисунке 14 изображён фрагмент года с передачей выборки из базы данных в таблицу.

```
using System.Linq;
using System.Windows.Controls;

namespace MartoyanWGUP2.Pages
{
    public partial class PartnerRealisationHistoryPage : Page
    {
        public PartnerRealisationHistoryPage(Partner partner)
        {
            InitializeComponent();
            Title = $"История реализации товара {partner.PartnersType.PartnerTypeName} {partner.PartnerName}";
            PartnerProductsDataGrid.ItemsSource = partner.PartnerProducts.ToList();
        }
    }
}
```

Рисунок 14 – передача записей из базы данных в таблицу

В листинге 9 представлен код страницы продаж партнёров

```
using System.Linq;
using System.Windows.Controls;

namespace MartoyanWGUP2.Pages
{
    public partial class PartnerRealisationHistoryPage : Page
    {
        public PartnerRealisationHistoryPage(Partner partner)
        {
            InitializeComponent();
            Title = $"История реализации товара
{partner.PartnersType.PartnerTypeName} {partner.PartnerName}";
            PartnerProductsDataGrid.ItemsSource =
partner.PartnerProducts.ToList();
        }
    }
}
```

На листинге 10 показан класс с методом для расчёта необходимого количества материала

Листинг 10 – класс с методом для расчёта необходимого количества материала

```
using System;
using System.Linq;

namespace MartoyanWGUP2.Classes
{
    internal class ProductionClass
    {
        ProductionDBEntities _context = ProductionDBEntities.GetContext();

        public int GetProductionCount(int ProdID, int MatTypeID, int
CountNeeded, double Fp, double Sp)
        {
            if (Fp < 0 || Sp < 0)
            {
                return -1;
            }

            double Coeficent = (double)_context.ProductTypes.FirstOrDefault(x
=> x.ID == ProdID).Coefficient;
            double DefectRate =
(double)_context.MaterialTypes.FirstOrDefault(x => x.ID ==
MatTypeID).DefectRate;

            if (Coeficent == 0 || DefectRate == 0)
            {
                return -1;
            }

            double MaterialForOneProduction = Fp * Sp * Coeficent;

            return (int)Math.Ceiling(Convert.ToDouble(CountNeeded) /
(MaterialForOneProduction * (1.0 + DefectRate)));
        }
    }
}
```

На рисунке 15 изображён процесс установки пользовательской иконки приложения.

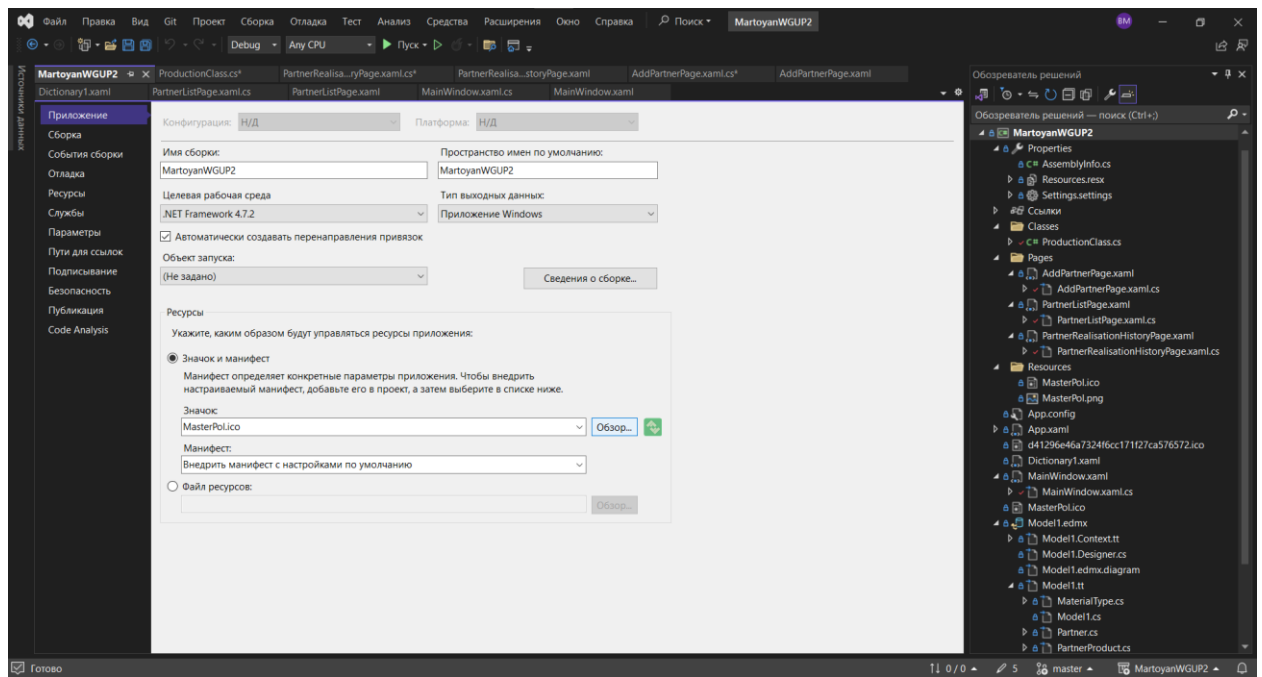


Рисунок 15 – установка пользовательского значка приложения