7. Develop an app to capture a photo and store it into SDCard, and extend this app to display all the images captured in the grid view.

a) Utilize the Camera functionality.

b) Implement writing data to the SD card.

**7a)**

**activity\_main.xml**

*<?*xml version="1.0" encoding="utf-8"*?>*<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:app="http://schemas.android.com/apk/res-auto"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:gravity="center\_horizontal"  
 android:orientation="vertical"  
 tools:context=".MainActivity">  
  
 <ImageView  
 android:id="@+id/imgCamera"  
 android:layout\_width="400dp"  
 android:layout\_height="240dp"  
 android:scaleType="fitXY" />  
 <Button  
 android:id="@+id/btnCamera"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="21dp"  
 android:text="Open Camera"/>  
</LinearLayout>

**MainActivity.java**

package com.example.program7;  
  
import androidx.activity.result.ActivityResult;  
import androidx.activity.result.ActivityResultCallback;  
import androidx.activity.result.ActivityResultLauncher;  
import androidx.activity.result.contract.ActivityResultContracts;  
import androidx.annotation.Nullable;  
import androidx.appcompat.app.AppCompatActivity;  
  
import android.content.Intent;  
import android.graphics.Bitmap;  
import android.os.Bundle;  
import android.provider.MediaStore;  
import android.view.View;  
import android.widget.Button;  
import android.widget.ImageView;  
  
public class MainActivity extends AppCompatActivity {  
 private final int CAMERA\_REQ\_CODE = 100;  
 ImageView imgCamera;  
 ActivityResultLauncher<Intent> activityResultLauncher;  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.*activity\_main*);  
  
 imgCamera = findViewById(R.id.*imgCamera*);  
 Button btnCamera = findViewById(R.id.*btnCamera*);  
  
 activityResultLauncher = registerForActivityResult(new ActivityResultContracts.StartActivityForResult(), new ActivityResultCallback<ActivityResult>() {  
 @Override  
 public void onActivityResult(ActivityResult result) {  
 if (result.getResultCode() == *RESULT\_OK*) {  
 if (result.getResultCode() == CAMERA\_REQ\_CODE) {  
 *//for camera* Bitmap img = (Bitmap) (result.getData().getExtras().get("data"));  
 imgCamera.setImageBitmap(img);  
  
 }  
 }  
 }  
  
  
 });  
 btnCamera.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View view) {  
 Intent iCamera = new Intent(MediaStore.*ACTION\_IMAGE\_CAPTURE*);  
 activityResultLauncher.launch(iCamera);  
 *// startActivityForResult(iCamera, CAMERA\_REQ\_CODE);* }  
 });  
 }  
  
}

**7b)**

**activity\_main.xml**

*<?*xml version="1.0" encoding="utf-8"*?>*<LinearLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:app="http://schemas.android.com/apk/res-auto"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:orientation="vertical"  
 tools:context=".MainActivity"  
 tools:ignore="ExtraText">  
  
 <Button  
 android:id="@+id/buttonSelectedImage"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:text="select\_image"/>  
 <ImageView  
 android:id="@+id/selectedImage"  
 android:layout\_width="match\_parent"  
 android:layout\_height="wrap\_content"  
 android:adjustViewBounds="true"  
 android:contentDescription="@string/app\_name" />  
 android:adjustViewBounds="true"  
 android:contentDescription="@string/app\_name" />  
  
</LinearLayout>

**MainActivity.java**

package com.example.program7a;  
  
import androidx.activity.result.ActivityResultLauncher;  
import androidx.annotation.Nullable;  
import androidx.appcompat.app.AppCompatActivity;  
import androidx.core.app.ActivityCompat;  
import androidx.core.content.ContextCompat;  
import android.Manifest;  
import android.content.Intent;  
import android.content.pm.PackageManager;  
import android.graphics.Bitmap;  
import android.graphics.BitmapFactory;  
import android.net.Uri;  
import android.os.Bundle;  
import android.provider.MediaStore;  
import android.view.View;  
import android.widget.ImageView;  
import android.widget.Toast;  
import java.io.InputStream;  
  
public class MainActivity extends AppCompatActivity  
{  
 private static final int *REQUEST\_CODE\_STORAGE\_PERMISSION* = 1;  
 private static final int *REQUEST\_CODE\_SELECT\_IMAGE* = 2;  
  
 private ImageView imageSelected;  
 ActivityResultLauncher<Intent> activityResultLauncher;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 setContentView(R.layout.*activity\_main*);  
 imageSelected = findViewById(R.id.*selectedImage*);  
  
 findViewById(R.id.*buttonSelectedImage*).setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View view) {  
 if (ContextCompat.*checkSelfPermission*(  
 getApplicationContext(), Manifest.permission.*READ\_EXTERNAL\_STORAGE* ) != PackageManager.*PERMISSION\_GRANTED*) {  
 ActivityCompat.*requestPermissions*(  
 MainActivity.this,  
 new String[]{Manifest.permission.*READ\_EXTERNAL\_STORAGE*},  
 *REQUEST\_CODE\_STORAGE\_PERMISSION*);  
 } else {  
 selectImage();  
  
 }  
 }  
 });  
  
 }  
  
  
 private void selectImage()  
 {  
 Intent intent = new  
 Intent(Intent.*ACTION\_PICK*,MediaStore.Images.Media.*EXTERNAL\_CONTENT\_URI*);  
 if(intent.resolveActivity(getPackageManager()) != null){  
 startActivityForResult(intent,*REQUEST\_CODE\_SELECT\_IMAGE*);  
 }  
 }  
 @Override  
 public void onRequestPermissionsResult(int requestCode,@Nullable String[]  
 permissions,@Nullable int[] grantResults)  
 {  
 super.onRequestPermissionsResult(requestCode,permissions,grantResults);  
  
 if(requestCode == *REQUEST\_CODE\_STORAGE\_PERMISSION* && grantResults.length > 0)  
 {  
 if(grantResults[0] == PackageManager.*PERMISSION\_GRANTED*)  
 {  
 selectImage();  
 }  
 else  
 {  
 Toast.*makeText*(this, "Permission Denied", Toast.*LENGTH\_SHORT*).show();  
 }  
 }  
 }  
  
 @Override  
 protected void onActivityResult(int requestCode, int resultCode, @Nullable Intent data) {  
 super.onActivityResult(requestCode, resultCode, data);  
 if(requestCode == *REQUEST\_CODE\_SELECT\_IMAGE* && resultCode == *RESULT\_OK*){  
 if(data != null){  
 Uri selectedImageUri = data.getData();  
 if(selectedImageUri != null){  
 try{  
  
 InputStream inputStream = getContentResolver().openInputStream(selectedImageUri);  
 Bitmap bitmap = BitmapFactory.*decodeStream*(inputStream);  
 imageSelected.setImageBitmap(bitmap);  
 }catch (Exception exception){  
 Toast.*makeText*(this,exception.getMessage(), Toast.*LENGTH\_SHORT*).show();  
 }  
 }  
 }  
 }  
 }  
}

**AndroidManifest.xml**

<uses-permission android:name="android.permission.READ\_EXTERNAL\_STORAGE"/>