2CEIT5PE18: MOBILE APPLICATION DEVELOPMENT

Practical: 4

AIM-Create an Android Alarm application by using service & BroadcastReceiver.

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Department of Computer Engineering

Practical-4

1. Create MainActivity according to below UI design.

2. Create AlarmBroadcastReceiver class

3. Create AlarmService Class

4. Add android.permission.SCHEDULE_EXACT_ALARM Permission in Manifest file

Study: BroadcastReceiver, Service, TextClock, TimePickerDialog, Calendar Class, SimpleDateFormat Class, PendingIntent, AlarmManager, getSystemService() method, sendBroadcast() method, MediaPlayer, startService(), stopService() method, Intent.getStringExtra(), Intent.putStringExtra(), MaterialCardView

Activity_main.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.constraintlayout.widget.ConstraintLayout
    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:id="@+id/main"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    tools:context=".MainActivity">

    <androidx.core.widget.NestedScrollView
        android:layout_width="match_parent"
        android:layout_height="match_parent">

        <androidx.constraintlayout.widget.ConstraintLayout
            android:layout_width="match_parent"
            android:layout_height="wrap_content">

            <com.google.android.material.card.MaterialCardView
                android:id="@+id/set_alram"
                android:layout_width="match_parent"
                android:layout_height="wrap_content"
                android:layout_margin="10dp"
                style="?attr/materialCardViewElevatedStyle"
                app:cardElevation="20dp"
                app:cardCornerRadius="25dp"
                app:layout_constraintTop_toTopOf="parent"
                app:layout_constraintStart_toStartOf="parent"
                app:layout_constraintEnd_toEndOf="parent">

                <androidx.constraintlayout.widget.ConstraintLayout
                    android:layout_width="match_parent"
                    android:layout_height="match_parent"
                    android:background="@color/light_green">

                    <ImageView
```

```xml
        android:id="@+id/img"
        android:layout_width="match_parent"
        android:layout_height="194dp"
        android:scaleType="centerCrop"
        app:srcCompat="@drawable/img"
        app:layout_constraintTop_toTopOf="parent" />

    <TextView
        android:id="@+id/textView"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Create Alarm Time"
        android:textSize="18sp"
        android:textColor="@color/design_default_color_on_secondary"
        android:layout_margin="16dp"
        android:textAppearance="?attr/textAppearanceTitleMedium"
        app:layout_constraintTop_toBottomOf="@id/img"
        app:layout_constraintStart_toStartOf="parent"/>

    <TextView
        android:id="@+id/textView1"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="By pressing buttons, Alarm can be created and
cancelled."
        android:layout_margin="16dp"
        android:textColor="@color/design_default_color_on_secondary"
        android:textAppearance="?attr/textAppearanceBodyMedium"
        app:layout_constraintTop_toBottomOf="@id/textView"
        app:layout_constraintStart_toStartOf="parent"/>

    <TextView
        android:id="@+id/textView2"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Check current time by looking below real digital clock"
        android:layout_margin="16dp"
        android:textColor="@color/design_default_color_on_secondary"
        app:layout_constraintTop_toBottomOf="@id/textView1"
        app:layout_constraintStart_toStartOf="parent"/>

    <TextClock
        android:id="@+id/textCurrentTime"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:format12Hour="hh:mm:ss a MMM,dd yyyy"
        android:textStyle="bold"
        android:textSize="18sp"
        android:textColor="@android:color/black"
        android:layout_marginTop="20dp"
        app:layout_constraintTop_toBottomOf="@id/textView2"
        app:layout_constraintStart_toStartOf="parent"
        app:layout_constraintEnd_toEndOf="parent"/>

    <com.google.android.material.button.MaterialButton
        android:id="@+id/set_button"
        android:layout_width="wrap_content"
        android:layout_height="wrap_content"
        android:text="Create Alarm"
        android:drawableTint="@color/design_default_color_on_primary"
```

```xml
                android:textColor="@color/design_default_color_on_primary"
                android:drawableLeft="@drawable/outline_alarm_add_24"
                android:layout_margin="16dp"
                app:layout_constraintStart_toStartOf="parent"
                app:layout_constraintTop_toBottomOf="@id/textCurrentTime"
                app:layout_constraintBottom_toBottomOf="parent">

        </com.google.android.material.button.MaterialButton>
    </androidx.constraintlayout.widget.ConstraintLayout>
</com.google.android.material.card.MaterialCardView>

<com.google.android.material.card.MaterialCardView
    android:id="@+id/cancel_alarm"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_margin="10dp"
    style="?attr/materialCardViewElevatedStyle"
    android:visibility="gone"
    app:cardElevation="20dp"
    app:cardCornerRadius="25dp"
    app:layout_constraintTop_toBottomOf="@id/set_alram"
    app:layout_constraintStart_toStartOf="parent"
    app:layout_constraintEnd_toEndOf="parent">

    <androidx.constraintlayout.widget.ConstraintLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content">

        <ImageView
            android:id="@+id/alarmSetImage"
            android:layout_width="match_parent"
            android:layout_height="194dp"
            android:scaleType="centerCrop"
            app:srcCompat="@drawable/img"
            app:layout_constraintTop_toTopOf="parent"/>

        <TextView
            android:id="@+id/alarmSetText"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Set alarm time:"
            android:textSize="18sp"
            android:layout_margin="16dp"
            android:textAppearance="?attr/textAppearanceTitleMedium"
            app:layout_constraintTop_toBottomOf="@id/alarmSetImage"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintEnd_toEndOf="parent" />

        <TextView
            android:id="@+id/alarmTimeDisplay"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:format12Hour="hh:mm:ss a MMM,dd yyyy"
            android:textSize="18sp"
            android:textStyle="bold"
            app:layout_constraintTop_toBottomOf="@id/alarmSetText"
            app:layout_constraintBottom_toTopOf="@id/cancelAlarmButton"
            app:layout_constraintStart_toStartOf="parent"
            app:layout_constraintEnd_toEndOf="parent" />
```

```xml
            <Button
                android:id="@+id/cancelAlarmButton"
                android:layout_width="wrap_content"
                android:layout_height="wrap_content"
                android:text="Cancel Alarm"
                android:drawableTint="@color/white"
                android:drawableLeft="@drawable/outline_alarm_off_24"
                android:layout_margin="16dp"
                app:layout_constraintBottom_toBottomOf="parent"
                app:layout_constraintStart_toStartOf="parent" />

        </androidx.constraintlayout.widget.ConstraintLayout>
    </com.google.android.material.card.MaterialCardView>

    </androidx.constraintlayout.widget.ConstraintLayout>

  </androidx.core.widget.NestedScrollView>
</androidx.constraintlayout.widget.ConstraintLayout>
```
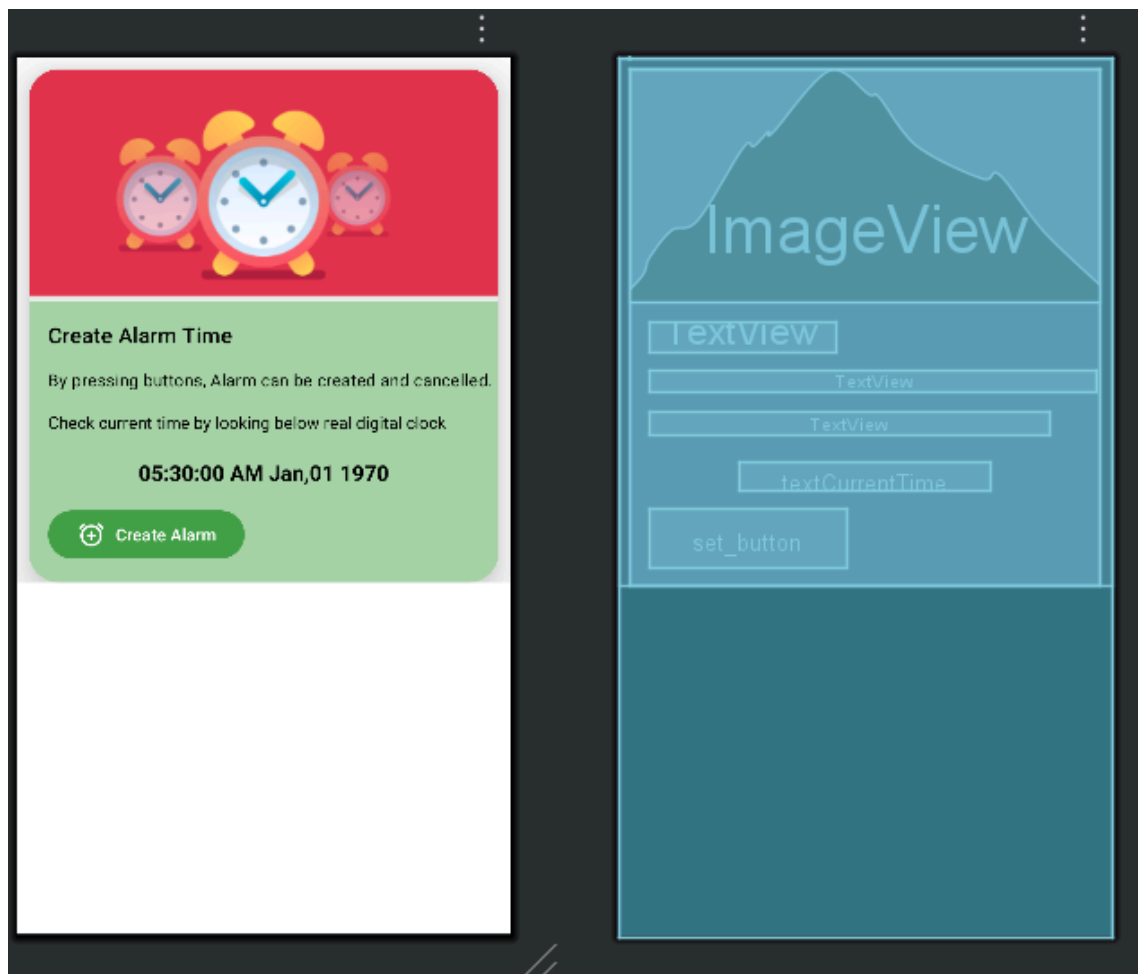
Output:

MainActivity.kt:

```kotlin
package com.example.mad_23012011066_practical_4

import android.app.AlarmManager
import android.app.PendingIntent
import android.app.TimePickerDialog
import android.content.Intent
import android.icu.util.Calendar
import android.os.Build
import android.os.Bundle
import android.provider.Settings
import android.view.View
import android.widget.TextView
import android.widget.Toast
import androidx.activity.enableEdgeToEdge
import androidx.annotation.RequiresApi
import androidx.appcompat.app.AppCompatActivity
import androidx.core.view.ViewCompat
import androidx.core.view.WindowInsetsCompat
import com.google.android.material.button.MaterialButton
import com.google.android.material.card.MaterialCardView
import java.text.SimpleDateFormat

class MainActivity : AppCompatActivity() {
    lateinit var cardListAlarm: MaterialCardView
    lateinit var cardCancelAlarm: MaterialCardView

    lateinit var btnCreateAlarm: MaterialButton
    lateinit var btnCancelAlarm: MaterialButton
    lateinit var textAlarmTime: TextView
    @RequiresApi(Build.VERSION_CODES.S)
    override fun onCreate(savedInstanceState: Bundle?) {
        super.onCreate(savedInstanceState)
        enableEdgeToEdge()
        setContentView(R.layout.activity_main)
        ViewCompat.setOnApplyWindowInsetsListener(findViewById(R.id.main)) { v, insets ->
            val systemBars = insets.getInsets(WindowInsetsCompat.Type.systemBars())
                        v.setPadding(systemBars.left,  systemBars.top,  systemBars.right,
systemBars.bottom)
            insets
        }
        cardListAlarm = findViewById(R.id.set_alram)
        cardCancelAlarm = findViewById(R.id.cancel_alarm)
        btnCreateAlarm = findViewById(R.id.set_button)
        btnCancelAlarm = findViewById(R.id.cancelAlarmButton)
        textAlarmTime = findViewById(R.id.alarmTimeDisplay)

        cardCancelAlarm.visibility = View.GONE

        btnCreateAlarm.setOnClickListener {
            showTimerDialog()
        }
        btnCancelAlarm.setOnClickListener {
            setAlarm(-1, "Stop")
            cardCancelAlarm.visibility=View.GONE
            val intent = Intent(this, AlarmService::class.java)
            stopService(intent)
        }
```

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```kotlin
    }

    @RequiresApi(Build.VERSION_CODES.S)
    private fun showTimerDialog() {
        val cldr: Calendar = Calendar.getInstance()
        val hour: Int = cldr.get(Calendar.HOUR_OF_DAY)
        val minutes: Int = cldr.get(Calendar.MINUTE)

        val picker = TimePickerDialog(
            this,
            { tp, sHour, sMinute -> sendDialogDataToActivity(sHour, sMinute) },
            hour,
            minutes,
            false
        )
        picker.show()
    }

    @RequiresApi(Build.VERSION_CODES.S)
    private fun sendDialogDataToActivity(hour: Int, minute: Int) {
        val alarmCalendar = Calendar.getInstance()
        val year: Int = alarmCalendar.get(Calendar.YEAR)
        val month: Int = alarmCalendar.get(Calendar.MONTH)
        val day: Int = alarmCalendar.get(Calendar.DATE)
        alarmCalendar.set(year, month, day, hour, minute, 0)
        cardCancelAlarm.visibility=View.VISIBLE
        setAlarm(alarmCalendar.timeInMillis,"Start")
        textAlarmTime.text = SimpleDateFormat("hh:mm ss a").format(alarmCalendar.time)
    }

    @RequiresApi(Build.VERSION_CODES.S)
    private fun setAlarm(millisTime: Long, str: String) {
        val intent = Intent(this, AlarmBroadcastReceiver::class.java)
        intent.putExtra("Service1", str)
        val pendingIntent =
            PendingIntent.getBroadcast(
                applicationContext,
                234324243,
                intent,
                PendingIntent.FLAG_IMMUTABLE
            )
        val alarmManager = getSystemService(ALARM_SERVICE) as AlarmManager
        if (str == "Start") {
            if (alarmManager.canScheduleExactAlarms()) {
                alarmManager.setExact(
                    AlarmManager.RTC_WAKEUP,
                    millisTime,
                    pendingIntent
                )
                Toast.makeText(this, "Start Alarm", Toast.LENGTH_LONG).show()
            } else {
                Toast.makeText(this, "Can't set Alarm", Toast.LENGTH_SHORT).show()
                startActivity((Intent(Settings.ACTION_REQUEST_SCHEDULE_EXACT_ALARM)))
            }
        } else if (str == "Stop") {
            alarmManager.cancel(pendingIntent)
            sendBroadcast(intent)
            Toast.makeText(this, "Stop Alarm", Toast.LENGTH_SHORT).show()
        }
```

```
    }
}
```

alarmbroadcastrecevier.kt:

```kotlin
package com.example.mad_23012011066_practical_4

import android.content.BroadcastReceiver
import android.content.Context
import android.content.Intent
import android.widget.Toast

class AlarmBroadcastReceiver : BroadcastReceiver() {
    override fun onReceive(context: Context, intent: Intent) {
        Toast.makeText(context, "Alarm triggered!", Toast.LENGTH_SHORT).show()
        val serviceIntent = Intent(context, AlarmService::class.java)
        context.startService(serviceIntent)

    }
}
```

alarmservice.kt:

```kotlin
package com.example.mad_23012011066_practical_4

import android.app.Service
import android.content.Intent
import android.media.MediaPlayer
import android.os.IBinder
import android.widget.Toast

class AlarmService : Service() {

    private var mediaPlayer: MediaPlayer? = null

    override fun onStartCommand(intent: Intent?, flags: Int, startId: Int): Int {
        Toast.makeText(this, "Alarm Service Started", Toast.LENGTH_SHORT).show()

        // Play alarm sound
        mediaPlayer = MediaPlayer.create(this, R.raw.alarm_music)
        mediaPlayer?.isLooping = true
        mediaPlayer?.start()

        return START_STICKY
    }

    override fun onDestroy() {
        super.onDestroy()
        mediaPlayer?.stop()
        mediaPlayer?.release()
        Toast.makeText(this, "Alarm Service Stopped", Toast.LENGTH_SHORT).show()
    }

    override fun onBind(intent: Intent?): IBinder? {
        return null
    }
}
```

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AndroidManifest.xml:

```xml
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:tools="http://schemas.android.com/tools">

    <uses-permission android:name="android.permission.SCHEDULE_EXACT_ALARM"/>
    <uses-permission android:name="android.permission.USE_EXACT_ALARM" />


    <application
        android:allowBackup="true"
        android:dataExtractionRules="@xml/data_extraction_rules"
        android:fullBackupContent="@xml/backup_rules"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.MAD_23012011066_Practical4">
        <activity
            android:name=".MainActivity"
            android:exported="true">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />
                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>
        <receiver android:name=".AlarmBroadcastReceiver"
            android:exported="false" />
        <service android:name=".AlarmService"
            android:exported="true" />

    </application>

</manifest>
```

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Output: