## **Activity\_main.xml(Portrait)**

<?xml version="1.0" encoding="utf-8"?>

<android.support.constraint.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:layout\_width="match\_parent"

android:layout\_height="match\_parent"

tools:context="com.sathish.mystopwatch.MainActivity">

<android.support.constraint.Guideline

android:id="@+id/guideline"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:orientation="horizontal"

app:layout\_constraintGuide\_percent="0.3" />

<ImageView

android:id="@+id/imageView"

android:layout\_width="0dp"

android:layout\_height="0dp"

android:layout\_marginBottom="8dp"

android:layout\_marginEnd="8dp"

android:layout\_marginStart="8dp"

android:layout\_marginTop="8dp"

app:layout\_constraintBottom\_toTopOf="@+id/guideline"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toTopOf="parent"

app:srcCompat="@drawable/logo" />

<TextView

android:id="@+id/textView"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="8dp"

android:layout\_marginStart="8dp"

android:layout\_marginTop="16dp"

android:text="Example of Services"

android:textSize="24sp"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toTopOf="@+id/guideline" />

<Button

android:id="@+id/startService"

android:layout\_width="0dp"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="24dp"

android:layout\_marginStart="24dp"

android:layout\_marginTop="16dp"

android:onClick="startService"

android:text="Start Service"

android:textSize="18sp"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toBottomOf="@+id/textView" />

<Button

android:id="@+id/startTime"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginStart="24dp"

android:layout\_marginTop="16dp"

android:onClick="startTime"

android:text="Start"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toBottomOf="@+id/startService" />

<Button

android:id="@+id/stopTime"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="8dp"

android:layout\_marginStart="8dp"

android:layout\_marginTop="16dp"

android:onClick="stopTime"

android:text="Stop"

app:layout\_constraintEnd\_toStartOf="@+id/resetTime"

app:layout\_constraintStart\_toEndOf="@+id/startTime"

app:layout\_constraintTop\_toBottomOf="@+id/startService" />

<Button

android:id="@+id/resetTime"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="24dp"

android:layout\_marginTop="16dp"

android:onClick="resetTime"

android:text="Reset"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintTop\_toBottomOf="@+id/startService" />

<Button

android:id="@+id/stopService"

android:layout\_width="0dp"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="24dp"

android:layout\_marginStart="24dp"

android:layout\_marginTop="16dp"

android:onClick="stopService"

android:text="Stop Service"

android:textSize="18sp"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toBottomOf="@+id/stopTime" />

<TextView

android:id="@+id/timeText"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="8dp"

android:layout\_marginStart="8dp"

android:layout\_marginTop="16dp"

android:text="00:00:000"

android:textColor="@color/colorAccent"

android:textSize="24sp"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toBottomOf="@+id/stopService" />

</android.support.constraint.ConstraintLayout>

## **Activity\_main.xml(Landscape)**

<?xml version="1.0" encoding="utf-8"?>

<ScrollView 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.support.constraint.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:layout\_width="match\_parent"

android:layout\_height="match\_parent">

<android.support.constraint.Guideline

android:id="@+id/guideline"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:orientation="horizontal"

app:layout\_constraintGuide\_percent="0.3" />

<ImageView

android:id="@+id/imageView"

android:layout\_width="0dp"

android:layout\_height="0dp"

android:layout\_marginBottom="8dp"

android:layout\_marginEnd="8dp"

android:layout\_marginStart="8dp"

android:layout\_marginTop="8dp"

app:layout\_constraintBottom\_toTopOf="@+id/guideline"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toTopOf="parent"

app:srcCompat="@drawable/logo" />

<TextView

android:id="@+id/textView"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="8dp"

android:layout\_marginStart="8dp"

android:layout\_marginTop="16dp"

android:text="Example of Services"

android:textSize="24sp"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toTopOf="@+id/guideline" />

<Button

android:id="@+id/startService"

android:layout\_width="0dp"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="24dp"

android:layout\_marginStart="24dp"

android:layout\_marginTop="16dp"

android:onClick="startService"

android:text="Start Service"

android:textSize="18sp"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toBottomOf="@+id/textView" />

<Button

android:id="@+id/startTime"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginStart="24dp"

android:layout\_marginTop="16dp"

android:onClick="startTime"

android:text="Start"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toTopOf="@+id/guideline1" />

<Button

android:id="@+id/stopTime"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="8dp"

android:layout\_marginStart="8dp"

android:layout\_marginTop="16dp"

android:onClick="stopTime"

android:text="Stop"

app:layout\_constraintEnd\_toStartOf="@+id/resetTime"

app:layout\_constraintStart\_toEndOf="@+id/startTime"

app:layout\_constraintTop\_toTopOf="@+id/guideline1" />

<Button

android:id="@+id/resetTime"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="24dp"

android:layout\_marginTop="16dp"

android:onClick="resetTime"

android:text="Reset"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintTop\_toTopOf="@+id/guideline1" />

<Button

android:id="@+id/stopService"

android:layout\_width="0dp"

android:layout\_height="wrap\_content"

android:layout\_marginEnd="24dp"

android:layout\_marginStart="24dp"

android:layout\_marginTop="16dp"

android:onClick="stopService"

android:text="Stop Service"

android:textSize="18sp"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toBottomOf="@+id/stopTime" />

<TextView

android:id="@+id/timeText"

android:layout\_width="wrap\_content"

android:layout\_height="35dp"

android:layout\_marginBottom="50dp"

android:layout\_marginEnd="8dp"

android:layout\_marginStart="8dp"

android:layout\_marginTop="16dp"

android:text="00:00:000"

android:textColor="@color/colorAccent"

android:textSize="24sp"

app:layout\_constraintBottom\_toBottomOf="parent"

app:layout\_constraintEnd\_toEndOf="parent"

app:layout\_constraintStart\_toStartOf="parent"

app:layout\_constraintTop\_toBottomOf="@+id/stopService" />

<android.support.constraint.Guideline

android:id="@+id/guideline1"

android:layout\_width="wrap\_content"

android:layout\_height="wrap\_content"

android:layout\_marginTop="250dp"

android:orientation="horizontal"

app:layout\_constraintGuide\_begin="264dp"

app:layout\_constraintTop\_toTopOf="parent" />

</android.support.constraint.ConstraintLayout>

</ScrollView>

## **MainActivity.java**

package com.sathish.mystopwatch;

import android.content.ComponentName;

import android.content.Context;

import android.content.Intent;

import android.content.ServiceConnection;

import android.os.Handler;

import android.os.IBinder;

import android.os.Message;

import android.support.v7.app.AppCompatActivity;

import android.os.Bundle;

import android.util.Log;

import android.view.View;

import android.widget.Button;

import android.widget.TextView;

public class MainActivity extends AppCompatActivity {

private ServiceClass myService;

private Intent intent;

Button startService, stopService, startTime, stopTime, resetTime;

Boolean isBound = false, isRunning = false;

TextView timeText;

private int secs = 0;

private int mins = 0;

private int millis = 0;

private long currentTime = 0L;

public static Handler *sHandler*;

@Override

protected void onCreate(Bundle savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.*activity\_main*);

startService = (Button) findViewById(R.id.*startService*);

stopService = (Button) findViewById(R.id.*stopService*);

startTime = (Button) findViewById(R.id.*startTime*);

stopTime = (Button) findViewById(R.id.*stopTime*);

resetTime = (Button) findViewById(R.id.*resetTime*);

timeText = (TextView) findViewById(R.id.*timeText*);

intent = new Intent(this, ServiceClass.class);

MainActivity.*sHandler* = new Handler() {

@Override

public void handleMessage(Message timeMsg) {

super.handleMessage(timeMsg);

Log.*v*("time",timeMsg.obj.toString());

currentTime = Long.*valueOf*(timeMsg.obj.toString());

secs = (int) (currentTime / 1000);

mins = secs / 60;

secs = secs % 60;

millis = (int) (currentTime % 1000);

updatetime();

}

};

disableButton();

}

public void startService(View view){

bindService(intent, myConnection, Context.*BIND\_AUTO\_CREATE*);

}

public void stopService(View view){

if(isBound){

unbindService(myConnection);

stopService(new Intent(getApplicationContext(),ServiceClass.class));

isBound = false;

isRunning = false;

}

disableButton();

}

public void startTime(View view){

if(isBound){

myService.start();

isRunning = true;

}

disableButton();

}

public void stopTime(View view){

if(isBound){

myService.stop();

isRunning = false;

}

disableButton();

}

public void resetTime(View view){

if(isBound){

myService.reset();

isRunning = false;

}

disableButton();

}

public void updatetime(){

timeText.setText("" + mins + ":" + String.*format*("%02d", secs) + ":"

+ String.*format*("%03d", millis));

}

public void disableButton(){

if(isBound){

startService.setEnabled(false);

stopService.setEnabled(true);

if(isRunning){

startTime.setEnabled(false);

stopTime.setEnabled(true);

resetTime.setEnabled(true);

}else{

startTime.setEnabled(true);

stopTime.setEnabled(false);

resetTime.setEnabled(true);

}

}else{

startService.setEnabled(true);

stopService.setEnabled(false);

startTime.setEnabled(false);

stopTime.setEnabled(false);

resetTime.setEnabled(false);

}

}

private ServiceConnection myConnection = new ServiceConnection() {

@Override

public void onServiceConnected(ComponentName className,

IBinder service) {

ServiceClass.LocalBinder binder = (ServiceClass.LocalBinder) service;

myService = binder.getService();

isBound = true;

disableButton();

}

@Override

public void onServiceDisconnected(ComponentName arg0) {

myService.stop();

isBound = false;

}

};

}

## **ServiceClass.java**

package com.sathish.mystopwatch;

import android.app.Service;

import android.content.Intent;

import android.os.Binder;

import android.os.IBinder;

import android.os.Message;

import android.os.SystemClock;

import android.support.annotation.Nullable;

public class ServiceClass extends Service {

private final IBinder mBinder = new LocalBinder();

Boolean isRunning = false;

private long startTime = 0;

private long timeInMilliseconds = 0;

private long timeSwapBuff = 0;

private long updatedTime = 0;

private Message timeMsg;

@Nullable

@Override

public IBinder onBind(Intent intent) {

return mBinder;

}

@Override

public void onDestroy() {

super.onDestroy();

if(isRunning){

timeSwapBuff += timeInMilliseconds;

MainActivity.*sHandler*.removeCallbacks(updateTimer);

isRunning = false;

}

}

public class LocalBinder extends Binder {

public ServiceClass getService(){

return ServiceClass.this;

}

}

public void start(){

if (!isRunning) {

startTime = SystemClock.*uptimeMillis*();

MainActivity.*sHandler*.postDelayed(updateTimer, 0);

isRunning = true;

}

}

public void stop(){

if(isRunning){

timeSwapBuff += timeInMilliseconds;

MainActivity.*sHandler*.removeCallbacks(updateTimer);

isRunning = false;

}

}

public void reset(){

MainActivity.*sHandler*.removeCallbacks(updateTimer);

isRunning=false;

startTime = 0L;

timeInMilliseconds = 0L;

timeSwapBuff = 0L;

updatedTime = 0L;

timeMsg = new Message();

timeMsg.obj = updatedTime;

MainActivity.*sHandler*.sendMessage(timeMsg);

}

public Runnable updateTimer = new Runnable() {

public void run() {

timeInMilliseconds = SystemClock.*uptimeMillis*() - startTime;

updatedTime = timeSwapBuff + timeInMilliseconds;

timeMsg = new Message();

timeMsg.obj = updatedTime;

MainActivity.*sHandler*.sendMessage(timeMsg);

MainActivity.*sHandler*.postDelayed(this, 0);

}

};

}