Android App

Connect

1 Gesture

Try - GestureDetector 구현과 이해

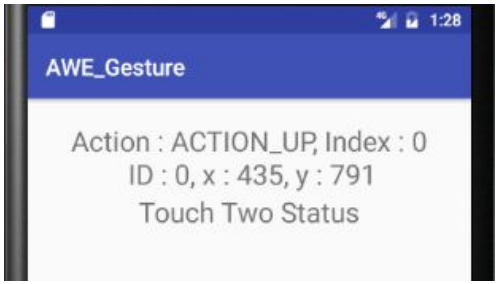
```
// activity_gesture_detector.xml
<ConstraintLaout …>
      <TextView    … android:id=@+gestureTextView />
// GestureDetectorActivity.java      → implements
GestureDetector.OnGestureListener,GestureDetector.OnDoubleTapListener
private  GestureDetector gestureDetector;
protected void onCreate(Bundle savedInstanceState) {  …
   setContentView(R.layout.activity_gesture_detector);
   gestureTextView = (TextView) findViewById(R.id.gestureTextView);
   this.gestureDetector = new GestureDetector(this, this);
}
@Override
public boolean onTouchEvent(MotionEvent event){
   this.gestureDetector.onTouchEvent(event);
   return super.onTouchEvent(event);
}
...
```

MotionEvent

- getActionMasked
  - ACTION_DOWN
    - View object의 Touch 좌표 리턴
  - ACTION_UP
    - View object에서 Touch 떨어지면 리턴.
  - ACTION_MOVE
    - ACTION_DOWN과 ACTION_UP 사이 모든 움직임 좌표 리턴.
- Pointer : View object에서 다중 Touch 접촉점.
  - ACTION_POINTER_DOWN : 시작 리턴
  - ACTION_POINTER_UP : 종료 리턴
  - int getActionIndex() : Pointer 발생 index
  - int getPointerId(index) : 발생 후 변경 없는 값(Touch 추적 시 사용)

Try - OnTouch Event 구현과 이해

```
// OnTouchEventActivity.java
ContraintLayout gestureLayout=(ContraintLayout)findViewById(R.id.gestureGround);
gestureLayout.setOnTouchListener(new View.OnTouchListener() {
   @Override
   public boolean onTouch(View v, MotionEvent event) {
      int pointerCnt = event.getPointerCount();
      int i, x, y, id, action, actionIndex ;      String actionStr = null, touchStatus = null;
      for(i=0; i<pointerCnt; i++){
         x = (int) event.getX(i);     y = (int) event.getY(i);  id = event.getPointerId(i);
         action = event.getActionMasked();    actionIndex = event.getActionIndex();
         switch (action){
            case MotionEvent.ACTION_DOWN:
               actionStr = "ACTION_DOWN";    break;
            case MotionEvent.ACTION_UP:
               actionStr = "ACTION_UP";          break;
            case MotionEvent.ACTION_MOVE:
               actionStr = "ACTION_MOVE";           break;    }
         touchStatus = "Action:"+actionStr+ "ID :"+id+", x : " + x + ", y : " + y ;
         if (id == 0){       touchOneStatus.setText(touchStatus);
         } else {       touchTwoStatus.setText(touchStatus);    }
      }            return true;    }
});
```

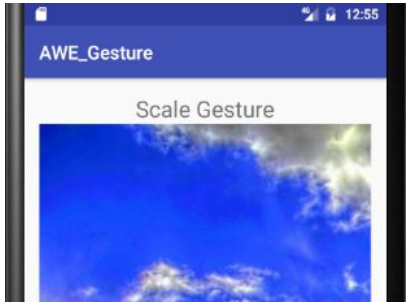


Try - CustomGestures 구현과 이해

```
// activity_custom_gestures.xml
<ConstraintrLayout … >
  <android.gesture.GestureOverlayView    ...
     android:id="@+id/gOverlay"
     android:gestureColor="#00000000"
     android:uncertainGestureColor="#00000000">
  </android.gesture.GestureOverlayView>
// CustomGesturesActivity.java
→ implements GestureOverlayView.OnGesturePerformedListener
private GestureLibrary gLibrary;
protected void onCreate(Bundle savedInstanceState) {  ...
  gLibrary = GestureLibraries.fromRawResource(this, R.raw.gestures);
  if (!gLibrary.load()) {      finish();   }
GestureOverlayView gOverlay=(GestureOverlayView)findViewById(R.id.gOverlay);
  gOverlay.addOnGesturePerformedListener(this);        }
public void onGesturePerformed(GestureOverlayView overlay, Gesture
     gesture) {
  ArrayList<Prediction> predictions = gLibrary.recognize(gesture);
  if (predictions.size() > 0 && predictions.get(0).score > 1.0) {
     String action = predictions.get(0).name;
     Toast.makeText(this, action, Toast.LENGT…   }     }
```

Try - Image scale gesture 구현과 이해

```
private ImageView imageView;     private Matrix matrix = new Matrix();
private float scale = 1f;     private ScaleGestureDetector SGD;
@Override
protected void onCreate(Bundle savedInstanceState) {  ...
   imageView=(ImageView)findViewById(R.id.imageView);
   imageView.setImageResource(R.drawable.scenery);
   imageView.setScaleType(ImageView.ScaleType.MATRIX);
   SGD = new ScaleGestureDetector(this,new ScaleListener());
}
public boolean onTouchEvent(MotionEvent ev) {
   SGD.onTouchEvent(ev);   return true;
}
private class ScaleListener extends
                        ScaleGestureDetector.SimpleOnScaleGestureListener {
   @Override
   public boolean onScale(ScaleGestureDetector detector) {
      scale *= detector.getScaleFactor();
      scale = Math.max(0.1f, Math.min(scale, 5.0f));
      matrix.setScale(scale, scale);      imageView.setImageMatrix(matrix);
      return true;   }
}
```

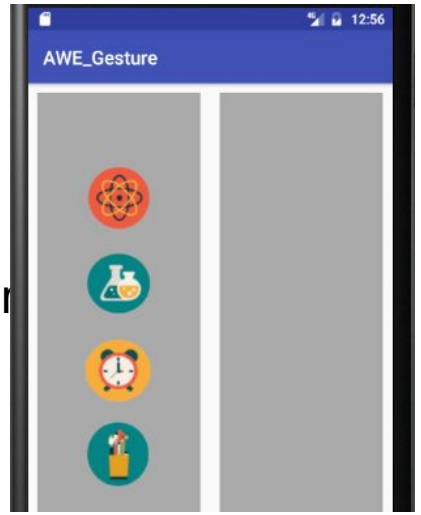


DragEvent

- ACTION_DRAG_STARTED
  - View object의 drag listener 가 startDrag() call 후 바로 받게 되는 이벤트.
- ACTION_DRAG_ENTERED
  - View의 bounding box에 shadow가 진입하면 발생. 만약 listener가 계속 이벤트를 받고자 하면 true 리턴해야 함.
- ACTION_DRAG_LOCATION
  - ACTION_DRAG_ENTERED 후에 계속적으로 bounding box 안에서 움직일 때 발생.
- ACTION_DRAG_EXITED
  - ACTION_DRAG_ENTERED 후에 bounding box에서 벗어날 때 발생.
- ACTION_DROP
  - View bounding box위에서 shadow를 release할 때 발생.(ACTION_DRAG_STARTED 에서 true를 반환했어야만 받을 수있음)
  - 또한 현재 layout이 아니면 받을 수 없으며, listener는 성공적으로 drop이벤트 처리 시 true를 반환 해야 함. 실패하면 false.
- ACTION_DRAG_ENDED
  - system 이 drag operation을 끝내면 전달.

Try - GestureDetector 구현과 이해

```
protected void onCreate(Bundle savedInstanceState) {       ...
   findViewById(R.id.box_view1).setOnTouchListener(onTouchListener);
   findViewById(R.id.box_view1).setOnDragListener(onDragListener);      … }
View.OnTouchListener onTouchListener = new View.OnTouchListener() {
   public boolean onTouch(View view, MotionEvent event) {
      if(event.getAction() == MotionEvent.ACTION_DOWN){
         eventX = view.getX();      eventY = view.getY();
         View.DragShadowBuilder shadowBuilder = new
View.DragShadowBuilder(view);
         view.startDrag(null, shadowBuilder, view, 0);
         view.setVisibility(View.INVISIBLE);      return true;
      }      return false;   }      };
View.OnDragListener onDragListener = new View.OnDragListener
   public boolean onDrag(View v, DragEvent event) {
      eventX = event.getX();       eventY = event.getY();
      if(event.getAction()==DragEvent.ACTION_DROP){
         View view = (View)event.getLocalState();
         if(v.getId() == R.id.left_view || v.getId() == R.id.right_view){
            ViewGroup source = (ViewGroup) view.getParent();
            source.removeView(view);
            LinearLayout target = (LinearLayout) v;
            target.addView(view);
         }
```

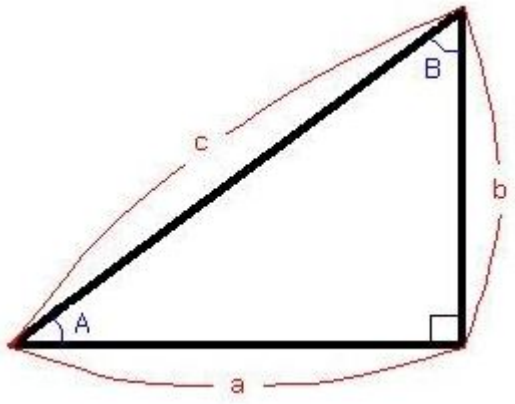


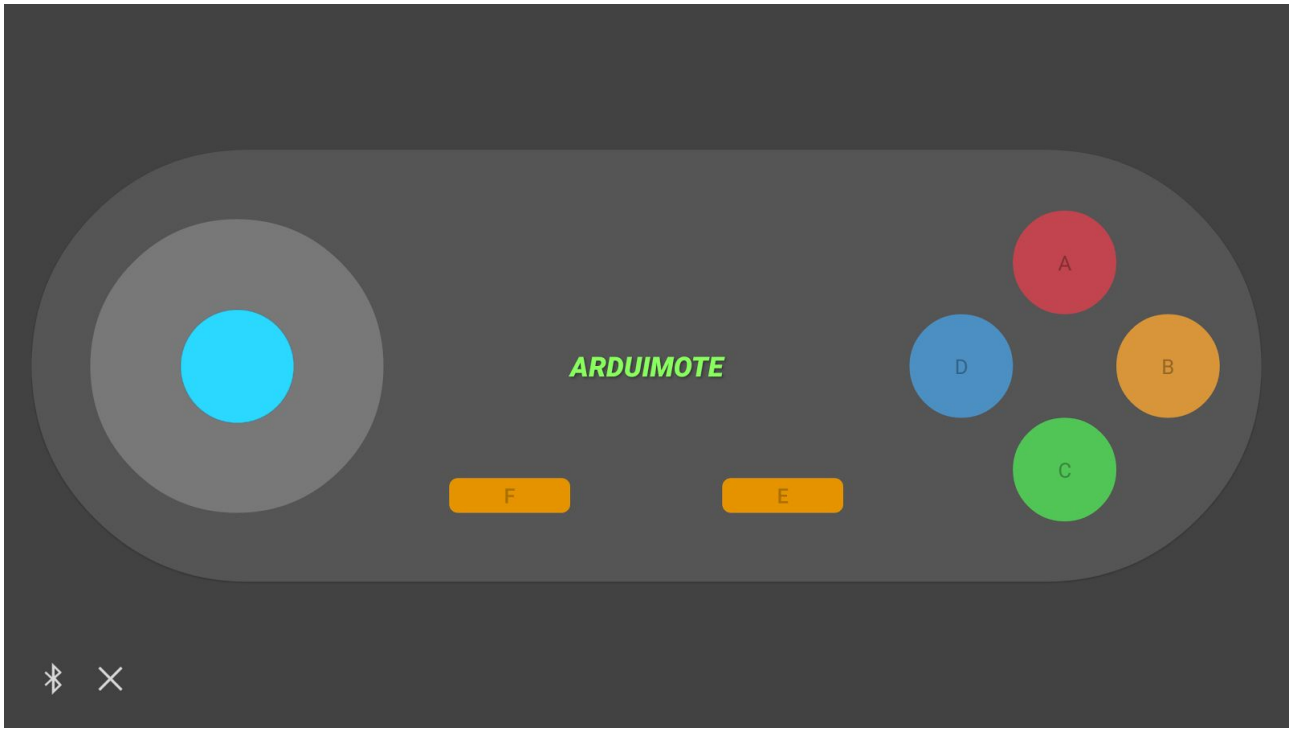
Try - Joystick Controller 구현과 이해

❖ 해 보기

➢ 좌우상하 여부 삼각 공식 활용(A 각도)

➢ tan x = b / a





2 Handler & Service

Thread - Playing Ball

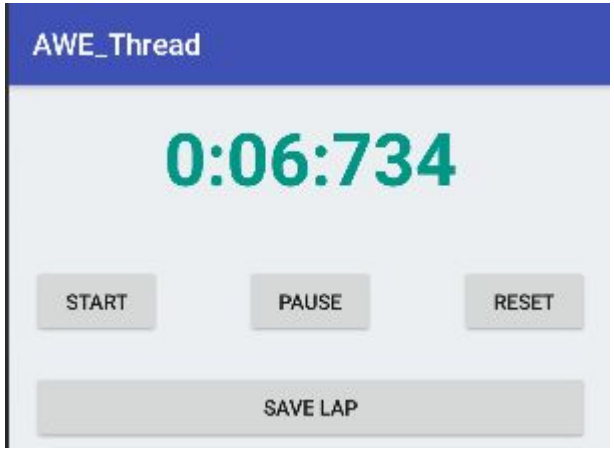
Thread Error(AWE_Thread)

❖ 자원 점유시 발생

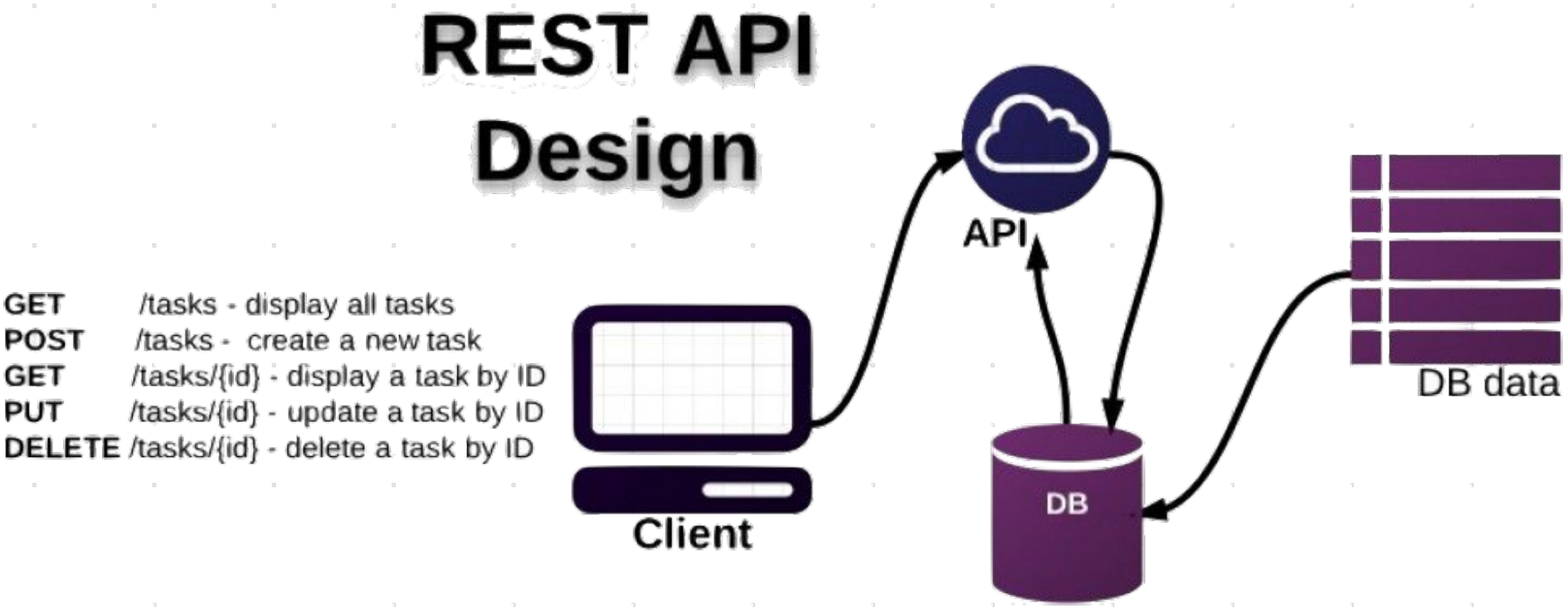
```
// ErrorThreadActivity.java
public void onClick(View view){
final String TAG = "ErrorThreadActivityTag";
   long endTime = System.currentTimeMillis() + 20 * 5000;
   Log.i(TAG, "Thread running !");
   TextView threadValue = (TextView) findViewById(R.id.threadValue);
   while (System.currentTimeMillis() < endTime){
      synchronized (this){
         Log.i(TAG, "Thread running !");
         threadValue.setText(String.valueOf(System.currentTimeMillis()));
      }
   }
   threadValue.setText("Error Pressed!");
}
```

Try - Stopwatch with Handler 구현과 이해

```
// StopwatchActivity.java
View textView, start, pause ;   Handler handler;
protected void onCreate(Bundle savedInstanceState) {  … }  → 각 객체 초기화
public void onClickStart(View view) {
    StartTime = SystemClock.uptimeMillis();
    handler.postDelayed(runnable, 0);   }
public void onClickPause(View view) {
    TimeBuff += MillisecondTime;
    handler.removeCallbacks(runnable);      }
public Runnable runnable = new Runnable() {
   public void run() {
      MillisecondTime = SystemClock.uptimeMillis() - StartTime;
      UpdateTime = TimeBuff + MillisecondTime;
      Seconds = (int) (UpdateTime / 1000);
      Minutes = Seconds / 60;         Seconds = Seconds % 60;
      MilliSeconds = (int) (UpdateTime % 1000);
      textView.setText(Minutes + ":" + String.format("%02d", Seconds) + ":"
            + String.format("%03d", MilliSeconds));
      handler.postDelayed(this, 0);
   }
};
```



Rest API


REST API
Design
GET /tasks - display all tasks
POST /tasks - create a new task
GET /tasks/{id} - display a task by ID
PUT /tasks/{id} - update a task by ID
DELETE /tasks/{id} - delete a task by ID
Client
API
DB
DB data

Rest API

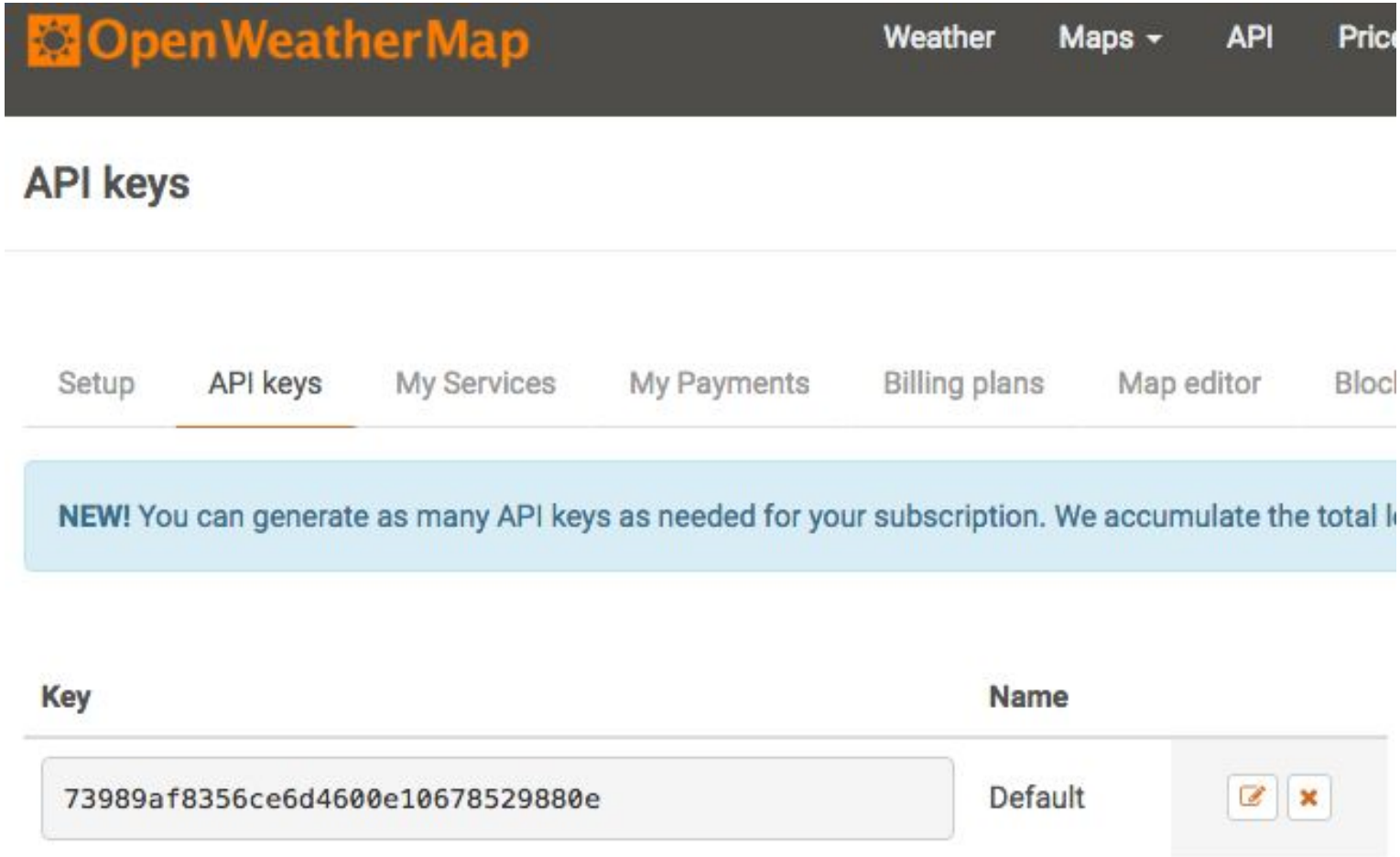
서비스명	로그인
RETURN MAP	member_json

논리명	I/O	필수여부	물리명	타입	테이블명	필드명	입력값	비고
회원 ID	I	O	login_id	VARCHAR(20)	member			
비밀번호	I	O	login_pwd	VARCHAR(20)	member			
디바이스 맥	I	O	device_mac	varchar(200)				
디바이스 type	I	O	device_type	tinyint	member			
디바이스 Number	I	O	device_no	VARCHAR(200)	member			
결과	O		resultNum	VARCHAR(10)				true / false
회원 ID	O		uid	VARCHAR(20)	member			
회원명	O		name	VARCHAR(20)	member			
회원등급	O		member_type	INT				B(교수) / C(학생)
회원사진	O		mem_img	varchar(50)				
회원 키 값	O		member_idx	INT	member			
최종접속일	O		last_login	VARCHAR(50)	member			

테스트URL	/widzet/login?login_id=mem01&login_pwd=1111
비고	테스트 관리자 정보 : admin / 1234 라스트 로그인 체크 회원이미지 경로 : /upload/member 폴더

Rest API

- http://api.openweathermap.org/data/2.5/weather?q=city&appid=?
- http://api.openweathermap.org/data/2.5/weather?id=&appid=?
- http://openweathermap.org/help/city_list.txt



Try - (1)Rest API 구현과 이해

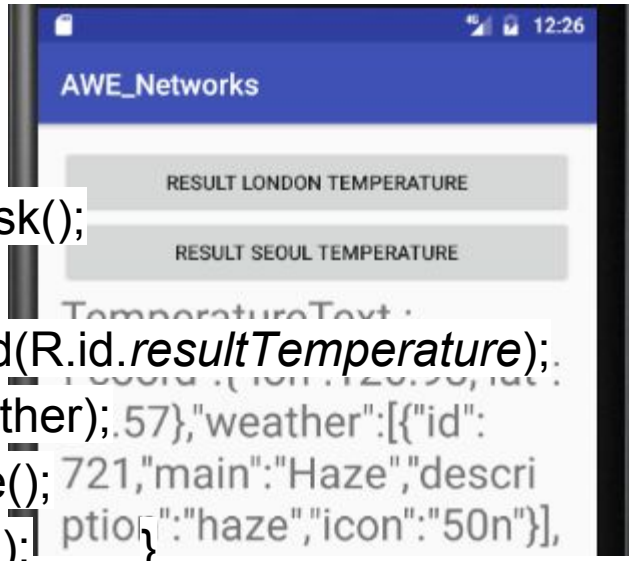
❖ 구현 설명

➢ Add in AndroidMainfest.xml

```
<uses-permission android:name="android.permission.INTERNET"/>
```

❖ 따라 해 보기

```
public void getWeather(View view){
  String id = "";
  switch (view.getId()){
     case R.id.londonButton :    id = "London"; break;  }
  OpenWeatherAPITask task= new OpenWeatherAPITask();
  try {    String weather = task.execute(id).get();
     TextView temperatureText = (TextView)findViewById(R.id.resultTemperature);
     temperatureText.setText("TemperatureText :" + weather);
  } catch (InterruptedException e) {      e.printStackTrace();
  } catch (ExecutionException e) {      e.printStackTrace();      }
}
```



Try - (2) Rest API 구현과 이해

```
class OpenWeatherAPITask extends AsyncTask<String, Void, String> {
  @Override
  public String doInBackground(String... params) {
    OpenWeatherAPIClient client = new OpenWeatherAPIClient();
    String id = params[0];    String weather = client.getWeather(id);       return weather;  }  }
class OpenWeatherAPIClient {
  final static String openWeatherURL = "http://api.openweathermap.org/data/2.5/weather";
  public String getWeather(String id){
    String weather ;       String urlString = openWeatherURL + "?q="+id+"&appid=???";
    try {    URL url = new URL(urlString);
      HttpURLConnection urlConnection = (HttpURLConnection) url.openConnection();
      InputStream in = new BufferedInputStream(urlConnection.getInputStream());
      weather = getStringFromInputStream(in);
    }catch(Exception e){    e.printStackTrace();   return null;       }       return weather;   }
  private static String getStringFromInputStream(InputStream is) {
    BufferedReader br = null;       StringBuilder sb = new StringBuilder();       String line;
    try {          br = new BufferedReader(new InputStreamReader(is));
      while ((line = br.readLine()) != null) {  sb.append(line);          }
    } catch (IOException e) {          e.printStackTrace();
    } finally { if (br != null) { try {br.close(); } catch (IOException e) { e.printStackTrace(); } } }
    return sb.toString();     }
```

Try - (1) Rest API 구현과 이해

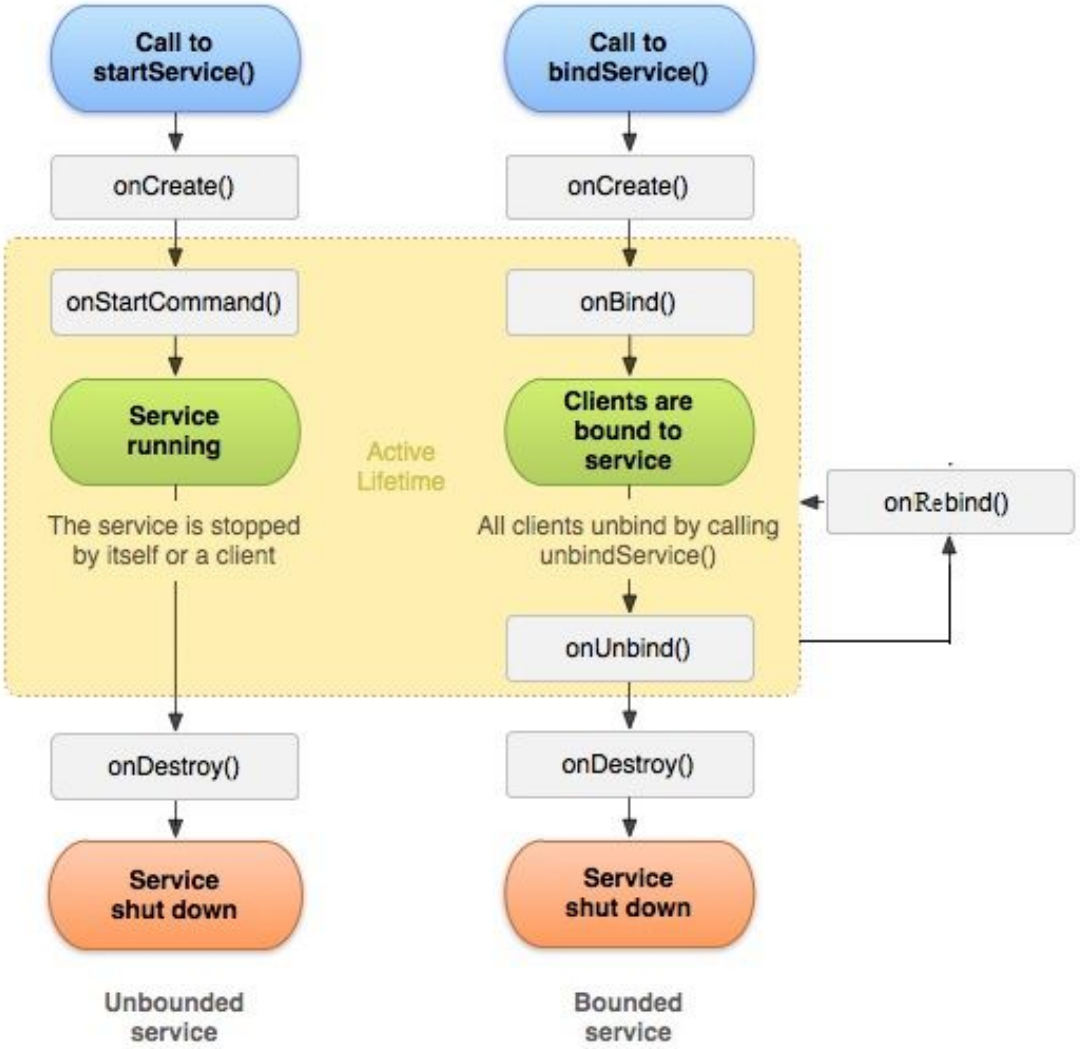
- 구현 설명
  - 오늘 날씨 정보
  - json 활용

```
JSONObject json = new JSONObject(getStringFromInputStream(in));
String Temperature = json.getJSONObject("main").getInt("temp");
String City = json.getString("name");
```

- 해 보기

Service (background service)

- Context.startService() : Background 동작
- Context.bindService() : Binder 통해 bind
- AIDL(Android Interface Definition Language) : 앱간 연계



Try(1) - bindService 구현과 이해

```
// MainActivity.java      → buttonStatus() 구현 필요.
private BackgroundMusicService mServiceBinder;
protected void onCreate(Bundle savedInstanceState) {      ...
   mBtnPlay = findViewById(R.id.btn_play);
   mBtnStop = findViewById(R.id.btn_stop);          }
public void onClick(View v) {
   if (mServiceBinder != null) {      mServiceBinder.play();   }     }
public void onClick(View v) {
   if (mServiceBinder != null) {          mServiceBinder.stop();      }     }
// BackgroundMusicService.java extends Service
private MediaPlayer mPlayer;
public boolean isPlaying() {
   boolean isPlaying = false;
   if (mPlayer != null) {  isPlaying = mPlayer.isPlaying();            }     return
isPlaying;      }
public void play() {
   mPlayer = MediaPlayer.create(this, R.raw.bensound_clearday);
   mPlayer.setLooping(true);      mPlayer.setVolume(100, 100);   mPlayer.start();   }
public void stop() {
   if (mPlayer.isPlaying()) {
      mPlayer.stop();     mPlayer.release();      mPlayer = null;     }     }
```

Try(2) - bindService 구현과 이해

```
// MainActivity.java      → buttonStatus() 구현 필요.
private ServiceConnection myConnection = new ServiceConnection() {
   public void onServiceConnected(ComponentName className, IBinder binder) {
     mServiceBinder = ((BackgroundMusicService.MyBinder) binder).getService(); }
   public void onServiceDisconnected(ComponentName className) {
       mServiceBinder = null;       }     }
protected void onResume() {     ...
   if (mServiceBinder == null) {
       Intent intent = new Intent(this, BackgroundMusicService.class);
       bindService(intent, myConnection, Context.BIND_AUTO_CREATE);      }
  startService(new Intent(getApplicationContext(),BackgroundMusicService.class)); }
protected void onPause() {        ....
   if (mServiceBinder != null) {
       mIsPlaying = mServiceBinder.isPlaying();
       if (!mIsPlaying) {   mServiceBinder.stopSelf();       }
       unbindService(myConnection); mServiceBinder = null;   }   }
// BackgroundMusicService.java extends Service
private final IBinder mBinder = new MyBinder();
public IBinder onBind(Intent arg0) {  return mBinder;    }
public class MyBinder extends Binder {
   BackgroundMusicService getService() { return BackgroundMusicService.this; } }
@Override    public int onStartCommand(Intent intent, int flags, int startId) {
   return START_NOT_STICKY;                }
```

3 Broadcast

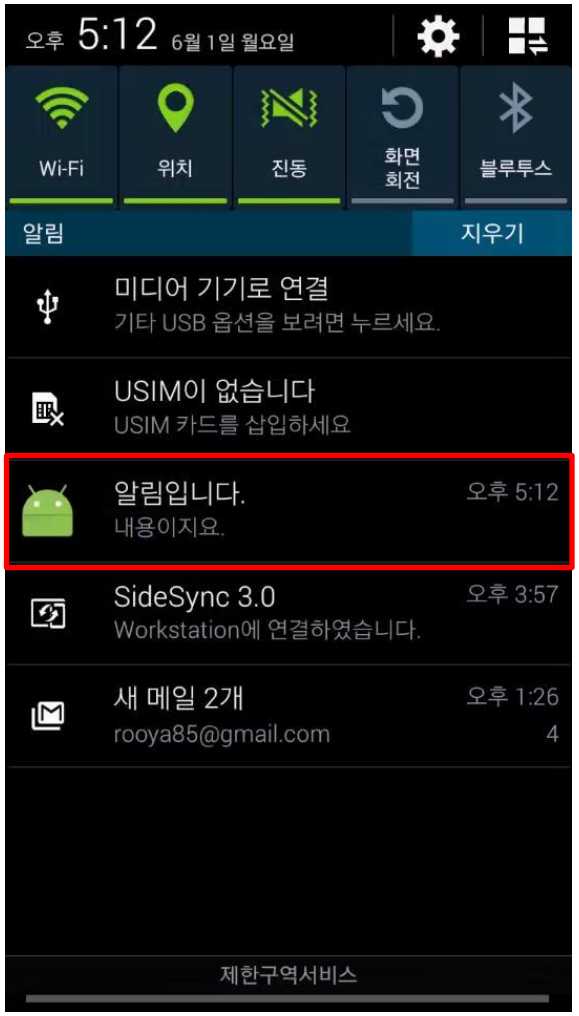
Try - BroadcastReceiver 동적 구현과 이해

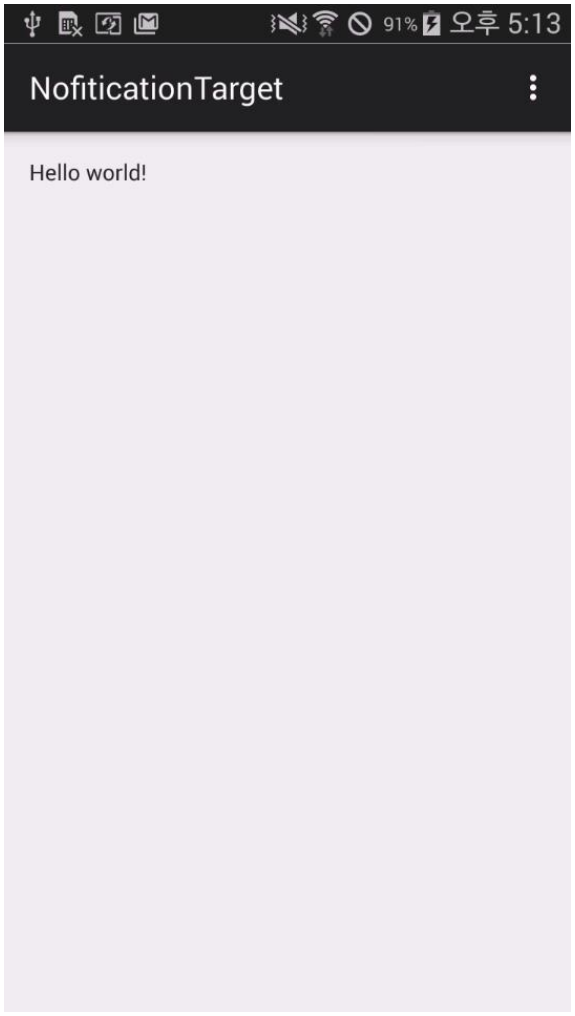
```
// BroadcastReceiverActivity.java
String VOL_ACTION ="android.media.VOLUME_CHANGED_ACTION";
BroadcastReceiver mReceiver = new BroadcastReceiver() {
   @Override
   public void onReceive(Context context, Intent intent) {
      String action = intent.getAction();        intent.getExtras();
      if (VOLUME_CHANGED_ACTION.equals(action)) {
         Toast.makeText(MainActivity.this, "change volume",...
      }
   }  };          → POWER_CONNECTED, DISCONNECTED 구현
protected void onResume() {  ...
   IntentFilter filterOn = new IntentFilter(VOL_ACTION);
filterOn.addAction("android.intent.action.ACTION_POWER_CONNECTED");
filterOn.addAction("android.intent.action.ACTION_POWER_DISCONNECTED");
   registerReceiver(mReceiver, filterOn);          }
protected void onPause() {          ...
   unregisterReceiver(mReceiver); }
```

4 Notification

Notification

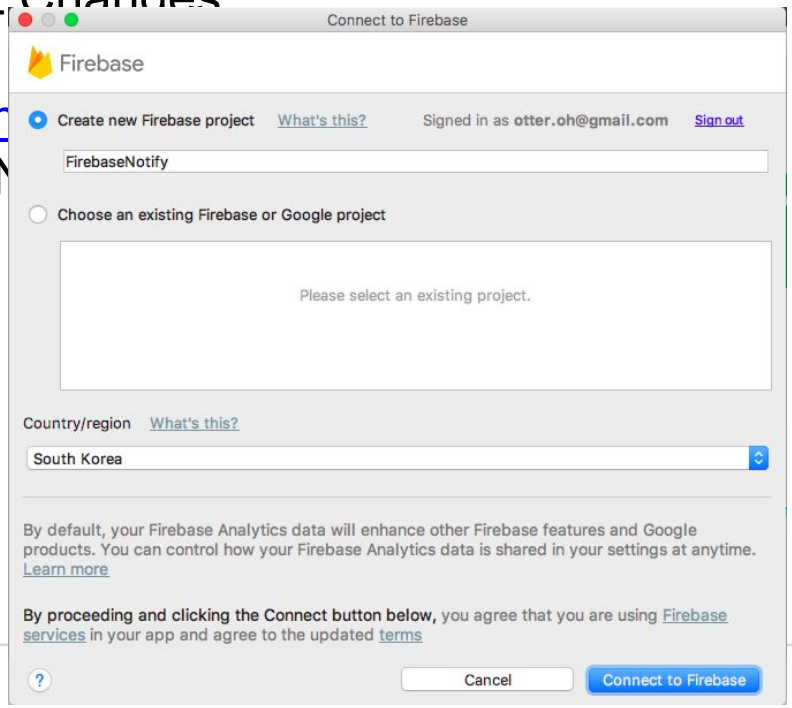
❖ 원격/로컬 기능.





FCM(Firebase Cloud Messaging)

- 앱에 원격 알림 전송.
- 준비 작업.
  - https://console.firebase.google.com/ → login
  - Firebase Plugin
    - Create Project
    - Tools > Firebase
    - Assistant > Cloud Messaging -> Set up Firebase Cloud Messaging
    - Connect to Firebase Dialog
    - Check google-service.json file
    - click FCM to your app > Accept Changes
  - execute background your app
  - https://console.firebase.google.com
    - Grow > Notification > Click 'SEN



Try - Foreground FCM 구현과 이해

```
// YJFBMessageService extends FirebaseMessagingService {
   String TAB = "YJFBMessageService";
   @Override
   public void onMessageReceived(RemoteMessage remoteMessage) {
       super.onMessageReceived(remoteMessage);
       Log.d(TAB, "Title : "+remoteMessage.getNotification().getTitle());
       Log.d(TAB, "message : "+remoteMessage.getNotification().getBody());
   }
}
```


수고하셨습니다.