LIFS
LEGAL INFORMATICS AND FORENSIC SCIENCE

App Inventor 2: Mobile Forensic Toolkit

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1. Hash란?

무결성의 원칙

- 수집 증거가 위·변조 되지 않았음을 증명
  - 수집 당시의 데이터 hash 값과 법정 제출 시점 데이터의 hash 값이 같다면 hash 함수의 특성에 따라 무결성을 입증

디지털 포렌식 개관, 박종혁 (2013)

2. 앱인벤터 확장기능

http://my.bryanqiang.com/createext.html

Tools you will need:
1.Git Bash(a software for download git code sources)
2.JDK(java 7)
3.a java code editor(Jedit,EditPlus,etc)
4.basic java programming experience
5.Apache ant(a software for complie extensions)

https://docs.google.com/document/d/1xk9dMfczvjbbwD-wMsr-ffqkTlE3ga0ocCE1KOb2wvw/pub#h.3kn0fmfydnq1

1b. The Class Hierarchy

All components fit within a class/interface hierarchy, a subset of which is shown in Figure 2. All components implemer
`Component` interface, which consists mostly of useful constants. Every component extends either the `VisibleComp`
`AndroidNonvisibleComponent` abstract classes, and some also implement the `ComponentContainer` interface.
`Form` (displayed to the user as "Screen"), which holds zero or more instances of `AndroidViewComponent`, the supe
components. Exceptions include `Sprite`, which can only be contained in a `Canvas`.

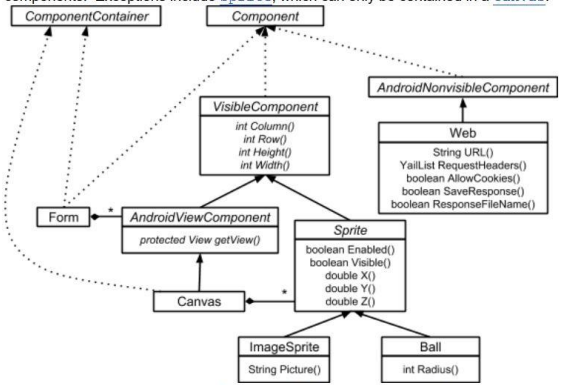

Figure 2: An incomplete subset of the component class/interface hierarchy. Interfaces and abstract methods are shown in italics.

CERTIFICATE

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has successfully completed the

Java Tutorial course

Yeva Hyusyan
Chief Executive Officer

Certificate #1068-1008753

ıngmi › appinventor-sources › appinventor › components › build › extensions

Name	Date modified	Type
com.sungmi.binaryConverter.aix	11/25/2018 6:22 PM	AIX Fil
com.sungmi.runtimeLogs.aix	11/25/2018 6:22 PM	AIX Fil
com.sungmi.sungmiHasher.aix	11/25/2018 6:22 PM	AIX Fil

ngmi › appinventor-sources › appinventor › components ›

Name
binaryConverter
runtimeLogs
sungmiHasher

ngmi › appinventor-sources › appinventor › lib

Name	Date modified	Type
gwt_incubator	11/15/2018 8:45 PM	File folder
gwt_query	11/15/2018 8:45 PM	File folder
gwt_svg	11/15/2018 8:45 PM	File folder
jdk5	11/15/2018 8:45 PM	File folder
jedis	11/15/2018 8:45 PM	File folder
json	11/15/2018 8:45 PM	File folder
jts	11/15/2018 8:45 PM	File folder
junit	11/15/2018 8:45 PM	File folder
junit4	11/15/2018 8:45 PM	File folder
junit-addons	11/15/2018 8:45 PM	File folder
kawa	11/15/2018 8:45 PM	File folder
keyczar	11/15/2018 8:45 PM	File folder
leaflet	11/15/2018 8:45 PM	File folder
log4j	11/15/2018 8:45 PM	File folder
oauth	11/15/2018 8:45 PM	File folder
objectify-3.1	11/15/2018 8:45 PM	File folder
org-apache-commons-codec	11/22/2018 4:53 AM	File folder
org-apache-commons-io	11/20/2018 10:48 PM	File folder

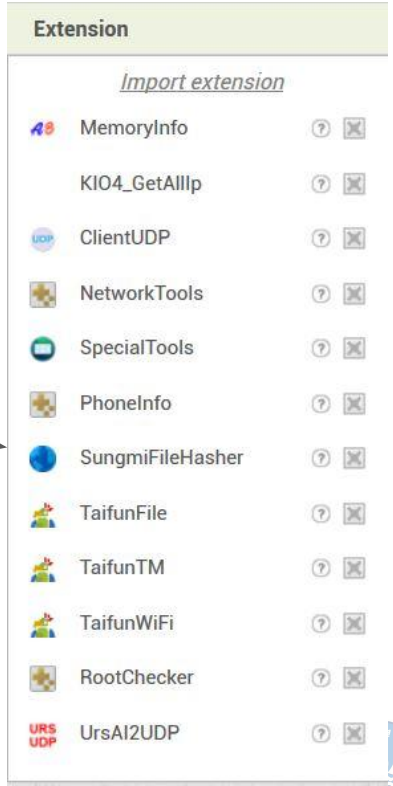
SungmiFileHasher.java

```
package com.sungmi.sungmiHasher;

//import libraries

import android.content.Context;
import android.util.Log;
//import android.app.Activity;
//import android.os.Environment;

import com.google.appinventor.components.annotations.*;
import com.google.appinventor.components.common.ComponentCategory;
import com.google.appinventor.components.runtime.*;
import com.google.appinventor.components.runtime.collect.Sets;
import com.google.appinventor.components.runtime.util.BoundingBox;
import com.google.appinventor.components.runtime.util.ErrorMessages;
import com.google.appinventor.components.runtime.util.FileUtil;
import com.google.appinventor.components.runtime.util.MediaUtil;
import com.google.appinventor.components.runtime.util.PaintUtil;
import com.google.appinventor.components.common.ComponentConstants;
import com.google.appinventor.components.common.PropertyTypeConstants;
import com.google.appinventor.components.common.YaVersion;
import org.apache.commons.codec.DecoderException;
import org.apache.commons.codec.binary.Hex;
import org.apache.commons.codec.digest.DigestUtils;

import java.io.FileNotFoundException;
import java.io.FileInputStream;
import java.io.InputStream;
import java.io.IOException;


//////////////////////////annotations for basic initialization/////////////////////////////////////

@DesignerComponent(version = YaVersion.SUNGMI_TEST_VERSION,
    description = "my testings",                                        //this is your extension's description
    category = ComponentCategory.EXTENSION,     //the category is extension
    nonVisible = true,                                                  //only can be nonvisible
    iconName = "images/web.png")                                        //picture path

@SimpleObject(external = true)
@UsesLibraries(libraries = "org-apache-commons-codec.jar")
@UsesPermissions(permissionNames = "android.permission.WRITE_EXTERNAL_STORAGE, android.permission.READ_EXTERNAL_STORAGE")

```

```
public class SungmiFileHasher extends AndroidNonvisibleComponent    //set your class name in XXX for replacement.
implements Component {

    public static final int VERSION = 0;    //version number
    private ComponentContainer container;                                   //define the component
    private Context context;                                                          //define the context
    private static final String LOG_TAG = "sungmi EXTENSION STARTS!!!!";
    private DigestUtils DigestUtils;
    private Hex Hex;
    private DecoderException DecoderException;
    //private final Activity activity;
    //private boolean isRepl = false;


   public SungmiFileHasher (ComponentContainer container) {
        super(container.$form());
        this.container = container;
        context = (Context) container.$context();                       //define the context
        Log.d(LOG_TAG, "sungmiHasher created" );                                  //record
    }

////////////////////////////////////////////add your code here/////////////////////////////////////////////////////////


 @SimpleFunction(description = "reads file as binary and hashes with md5")

 public String SungmiMD5(String fileName) {
    String md5String = null;

    //String md5String = null;
     try {
         //md5String = DigestUtils.md5Hex(new FileInputStream(fileName));
         md5String = new String(Hex.encodeHex(DigestUtils.md5(new FileInputStream(fileName))));

         //String s = new String(Hex.encodeHex(DigestUtils.md5(data)));
     } catch (IOException e){
         Log.d(LOG_TAG, "IO exception");
     }
     Log.d(LOG_TAG, "md5String");
     return md5String;
```

```
Sungmi@DESKTOP-FQTSSLM MINGW64 ~/appinventor-sources/appinventor (master)
$ ant extensions
Buildfile: C:\Users\Sungmi\appinventor-sources\appinventor\build.xml

extensions:
```

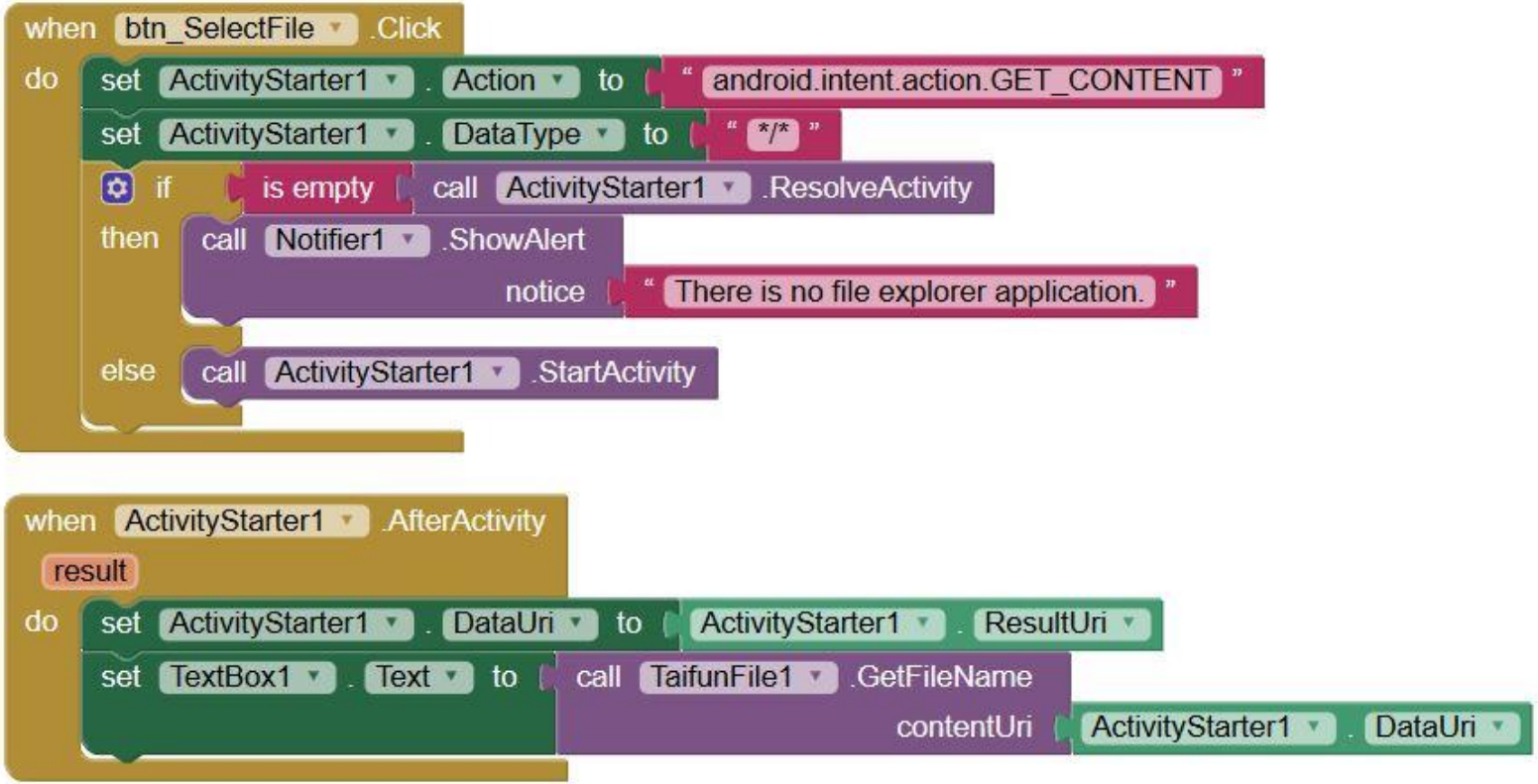
```
BUILD SUCCESSFUL
Total time: 3 minutes 3 seconds
Picked up _JAVA_OPTIONS: -Xmx1024m
```

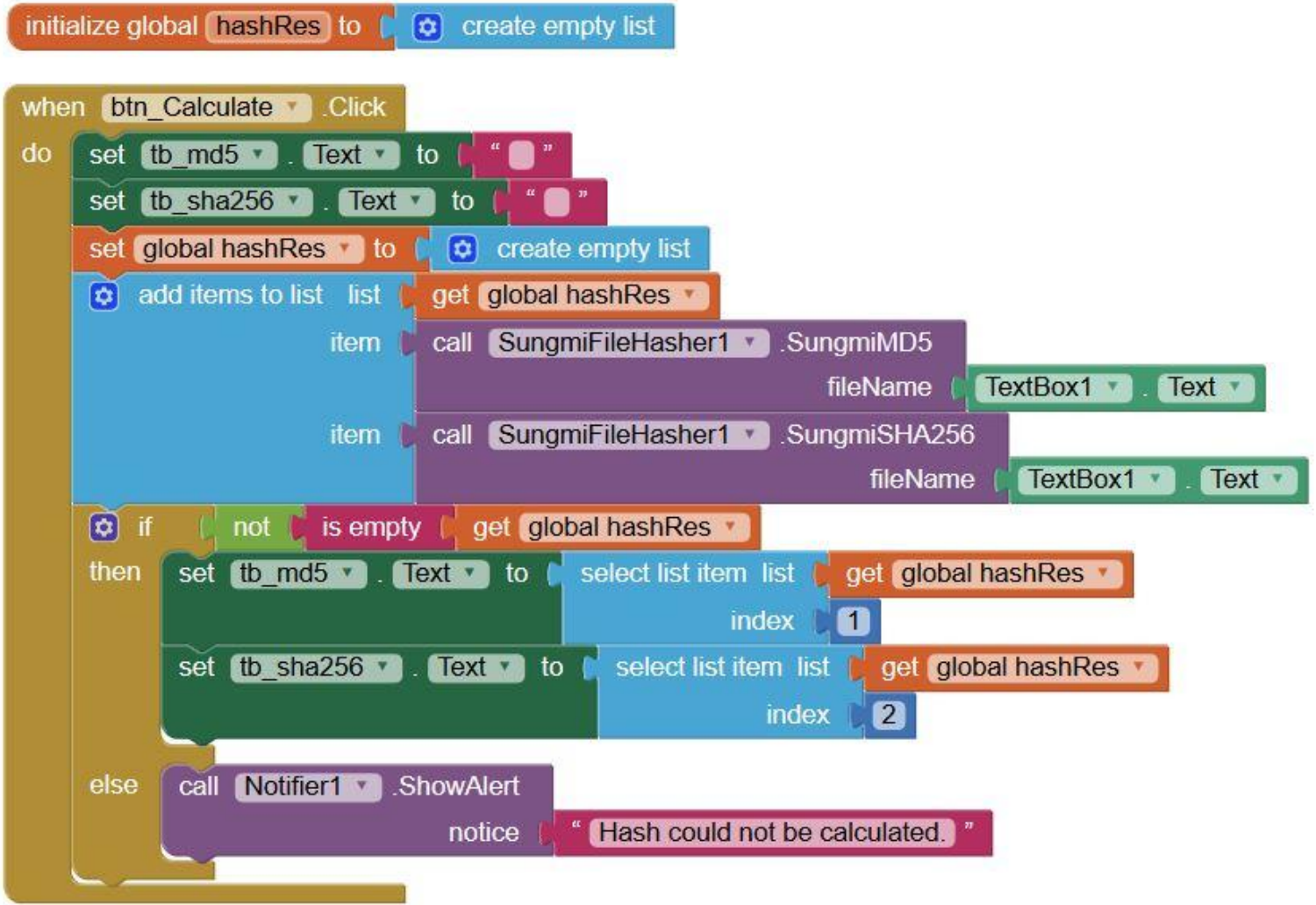


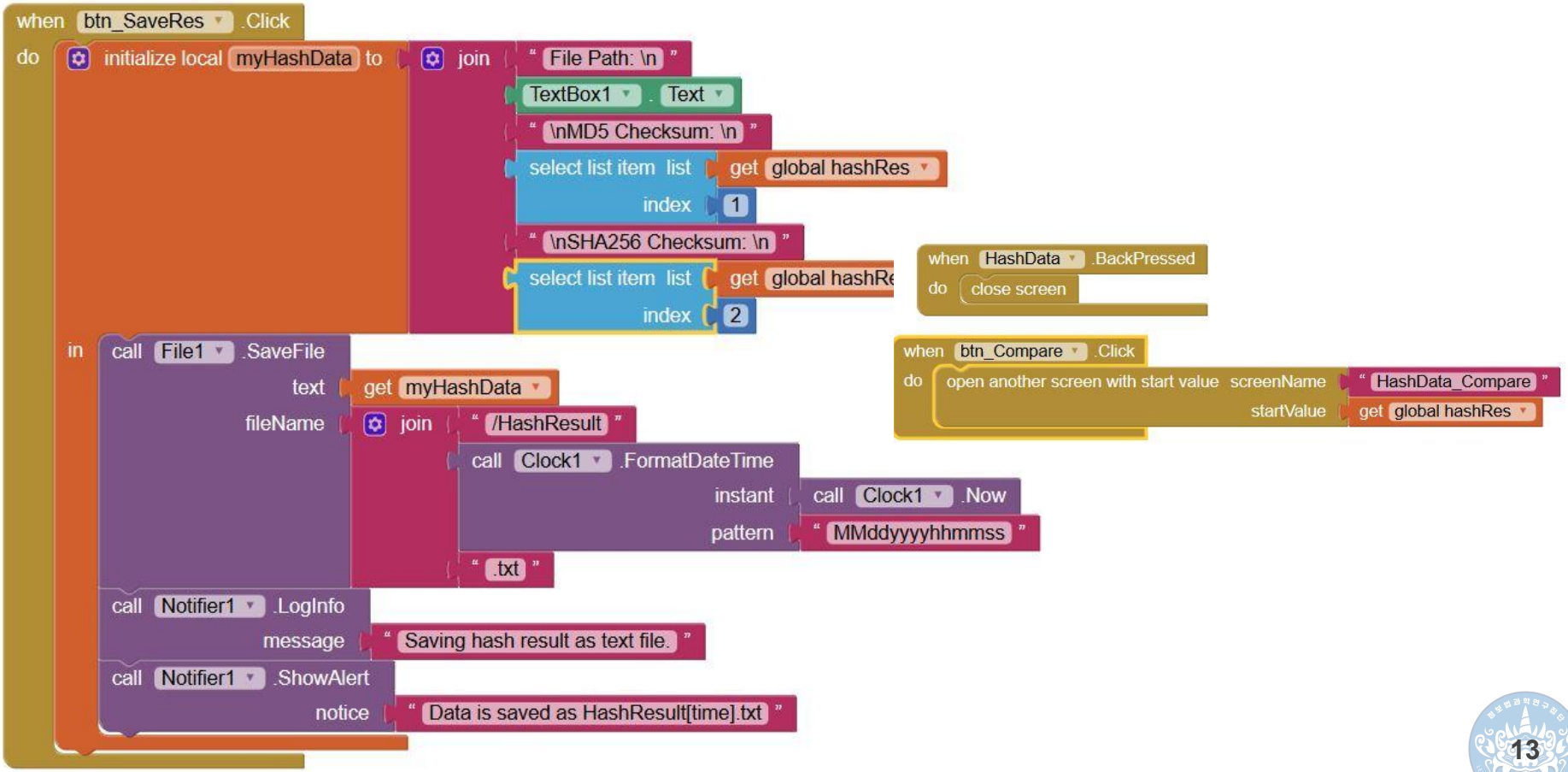
해쉬 기능 구동 영상

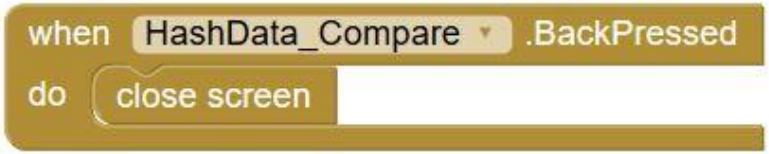
https://youtu.be/yF4ff1giKoA

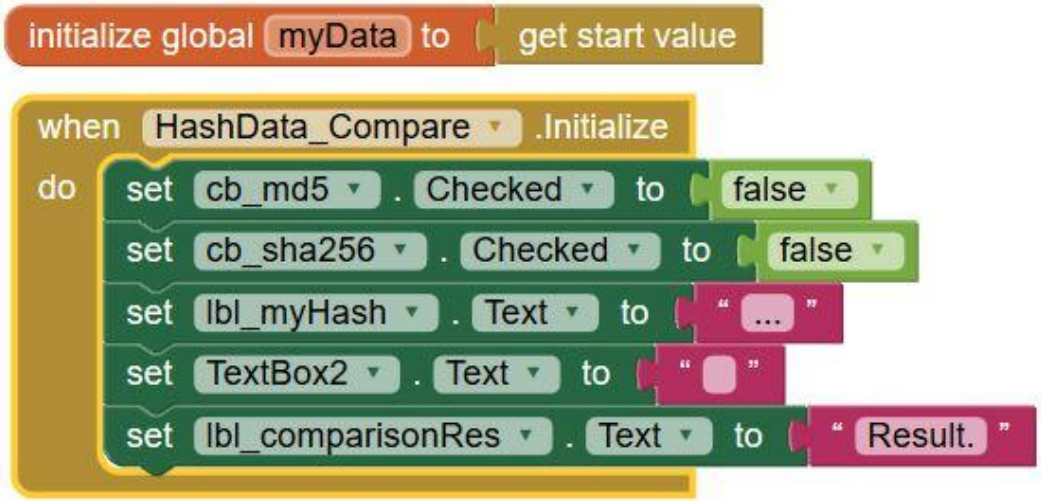
3. Mobile Forensic Kit

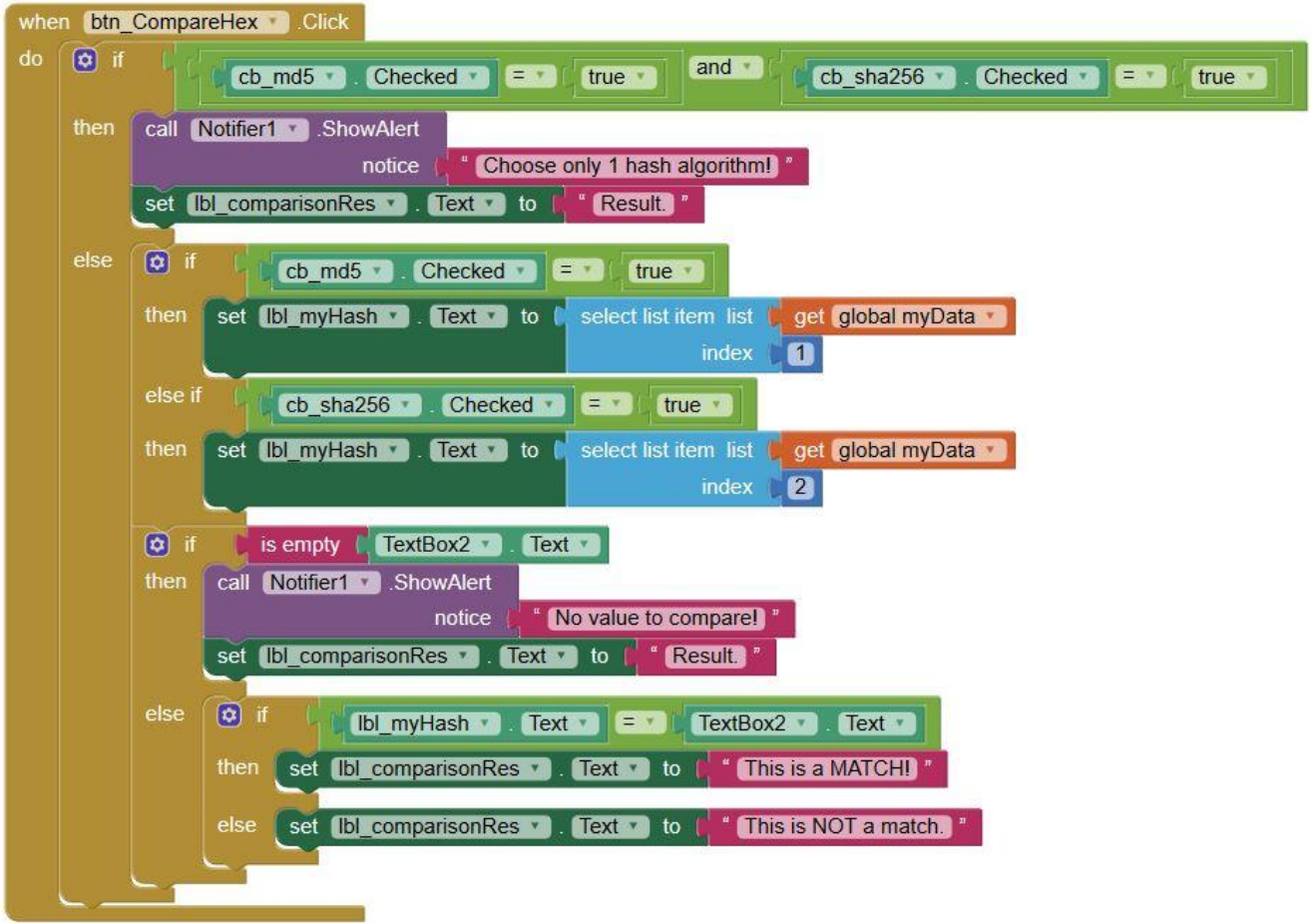



initialize global hashRes to create empty list
when btn_Calculate .Click
do set tb_md5 . Text to ""
set tb_sha256 . Text to ""
set global hashRes to create empty list
add items to list list get global hashRes
item call SungmiFileHasher1 .SungmiMD5
fileName TextBox1 . Text
item call SungmiFileHasher1 .SungmiSHA256
fileName TextBox1 . Text
if not is empty get global hashRes
then set tb_md5 . Text to select list item list get global hashRes
index 1
set tb_sha256 . Text to select list item list get global hashRes
index 2
else call Notifier1 .ShowAlert
notice "Hash could not be calculated."


when btn_SaveRes .Click
do initialize local myHashData to join " File Path: \n "
TextBox1 . Text
" \nMD5 Checksum: \n "
select list item list get global hashRes
index 1
" \nSHA256 Checksum: \n "
select list item list get global hashRe
index 2
in call File1 .SaveFile
text get myHashData
fileName join " /HashResult "
call Clock1 .FormatDateTime
instant call Clock1 .Now
pattern " MMddyyyyhhmmss "
" .txt "
call Notifier1 .LogInfo
message " Saving hash result as text file. "
call Notifier1 .ShowAlert
notice " Data is saved as HashResult[time].txt "
when HashData .BackPressed
do close screen
when btn_Compare .Click
do open another screen with start value screenName " HashData_Compare "
startValue get global hashRes


when HashData_Compare .BackPressed
do close screen


initialize global myData to get start value
when HashData_Compare .Initialize
do set cb_md5 . Checked to false
set cb_sha256 . Checked to false
set lbl_myHash . Text to " ... "
set TextBox2 . Text to " "
set lbl_comparisonRes . Text to " Result. "


when btn_CompareHex .Click
do
if cb_md5 . Checked = true and cb_sha256 . Checked = true
then call Notifier1 .ShowAlert
notice " Choose only 1 hash algorithm! "
set lbl_comparisonRes . Text to " Result. "
else if cb_md5 . Checked = true
then set lbl_myHash . Text to select list item list get global myData
index 1
else if cb_sha256 . Checked = true
then set lbl_myHash . Text to select list item list get global myData
index 2
if is empty TextBox2 . Text
then call Notifier1 .ShowAlert
notice " No value to compare! "
set lbl_comparisonRes . Text to " Result. "
else if lbl_myHash . Text = TextBox2 . Text
then set lbl_comparisonRes . Text to " This is a MATCH! "
else set lbl_comparisonRes . Text to " This is NOT a match. "

THANK YOU!

2ricecake@hallym.ac.kr

네트워크 포렌식

- **기기의 연결 상태 및 상세 정보를 제공**

  자동으로 연결되는 AP와 AP의 맥주소를 찾고,

  추후 AP에 대한 로그 감식을 할 수 있다.

  호스트 스캐닝을 통해 지정한 아이피 대역에 있는 호스트를 검색한다.

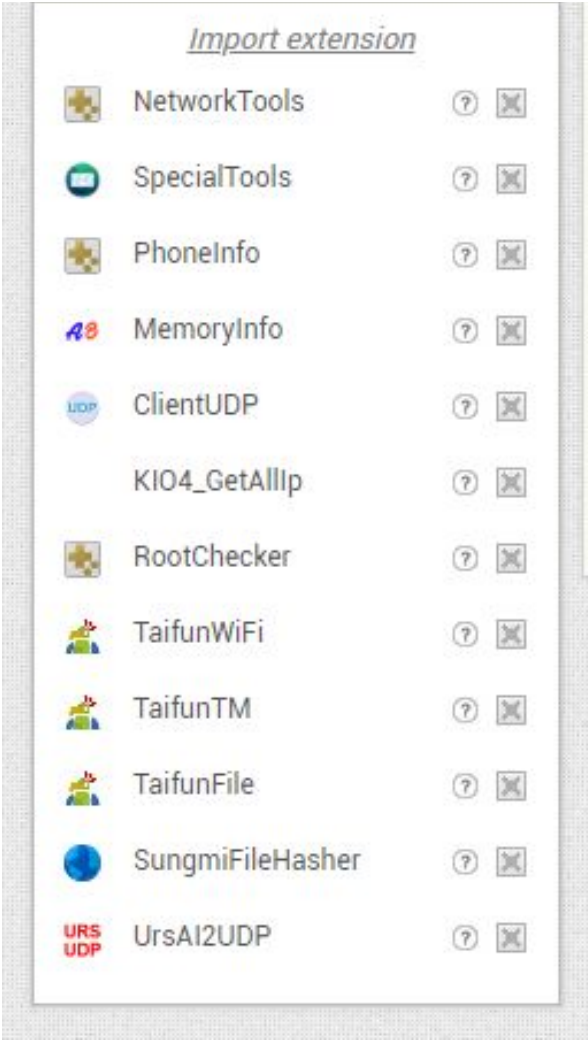
시스템 정보 조회

- **기기의 하드웨어 리비전 및 소프트웨어 버전 제공**

  하드웨어 버전, 안드로이드API, 부트로더, 루트유무, SIM 및 셀룰러 정보,

  소프트웨어 버전, RAM / ROM 사용량 등등

: 각기 다른 기기 사양 및 환경에 맞춘 포렌식 환경 구성 가능



Extension

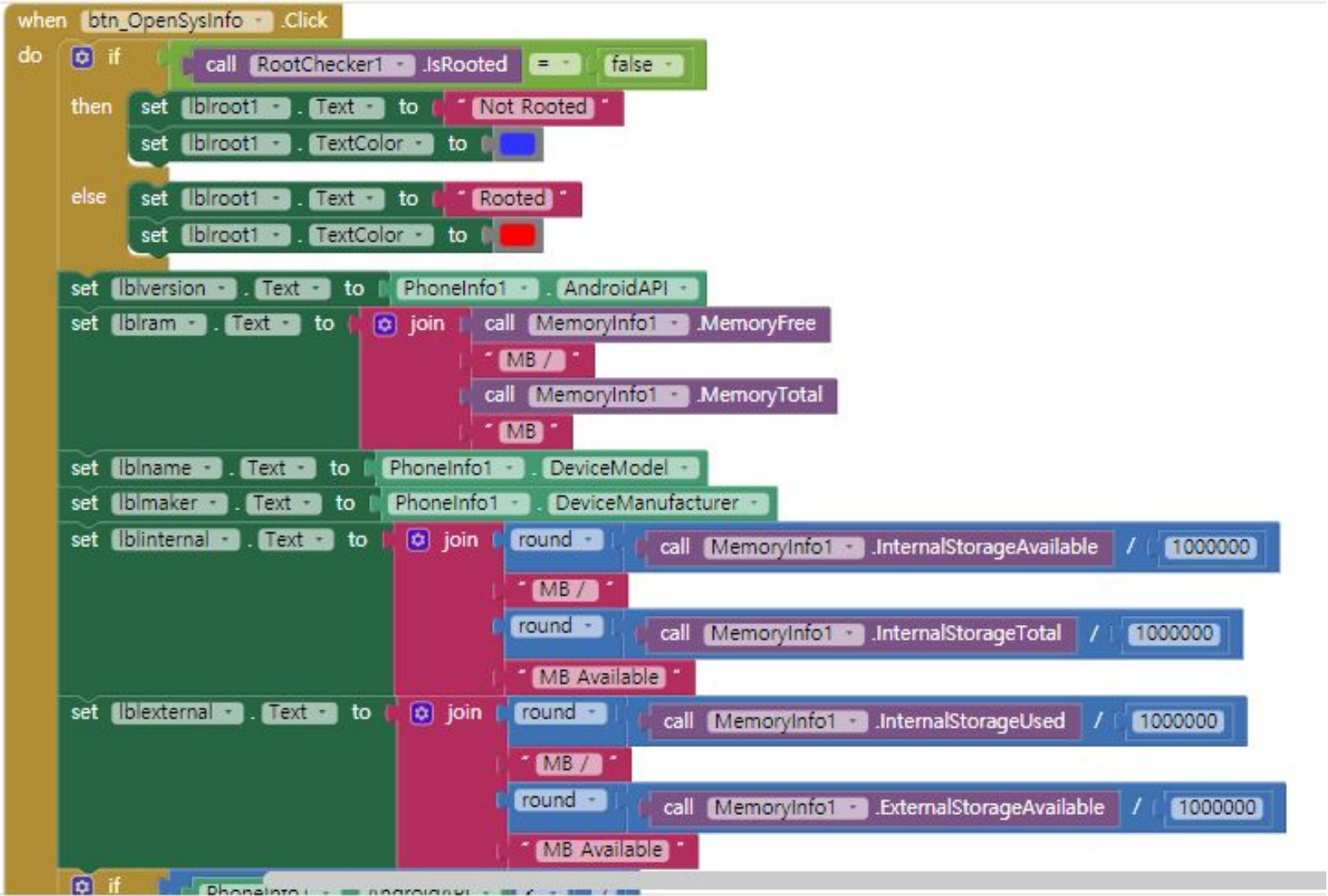
- **다양한 서드파티 확장 기능 존재**

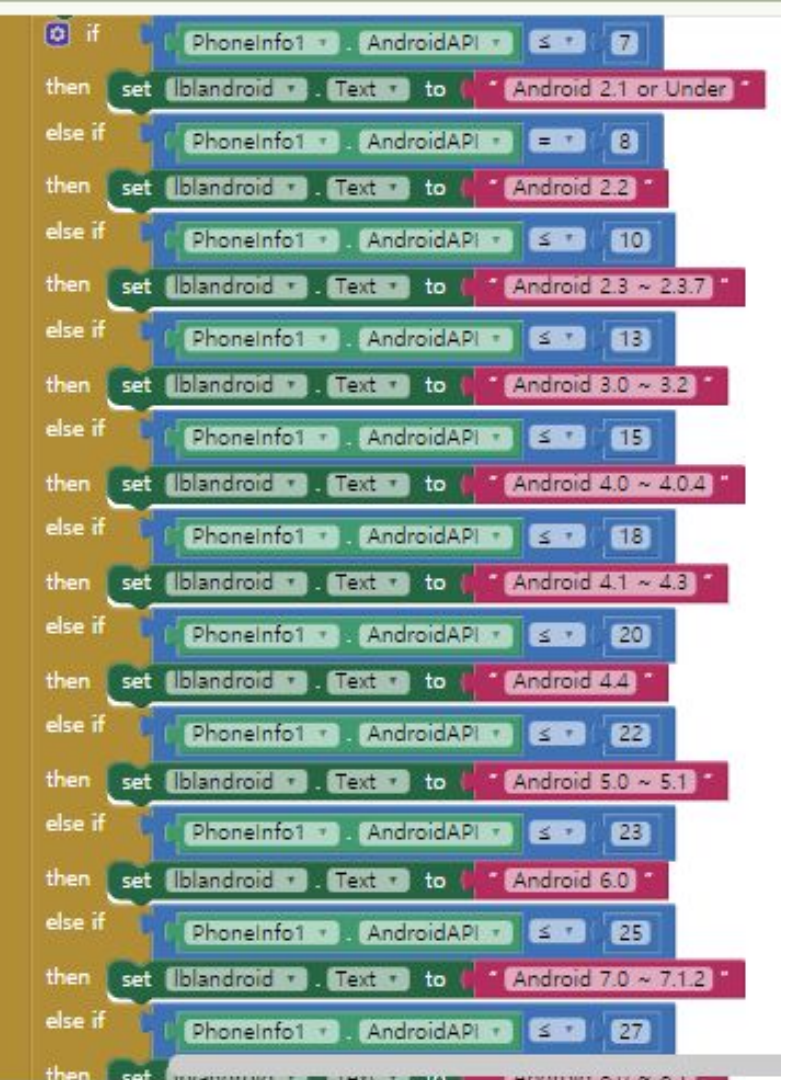
  자바 기반으로 작성된 *.aix 파일들.

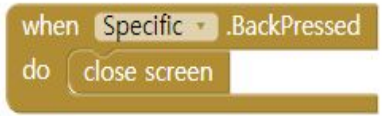
  개인 개발자 및 단체 개발자들이 다수 제작.

  유료화모델도 존재.

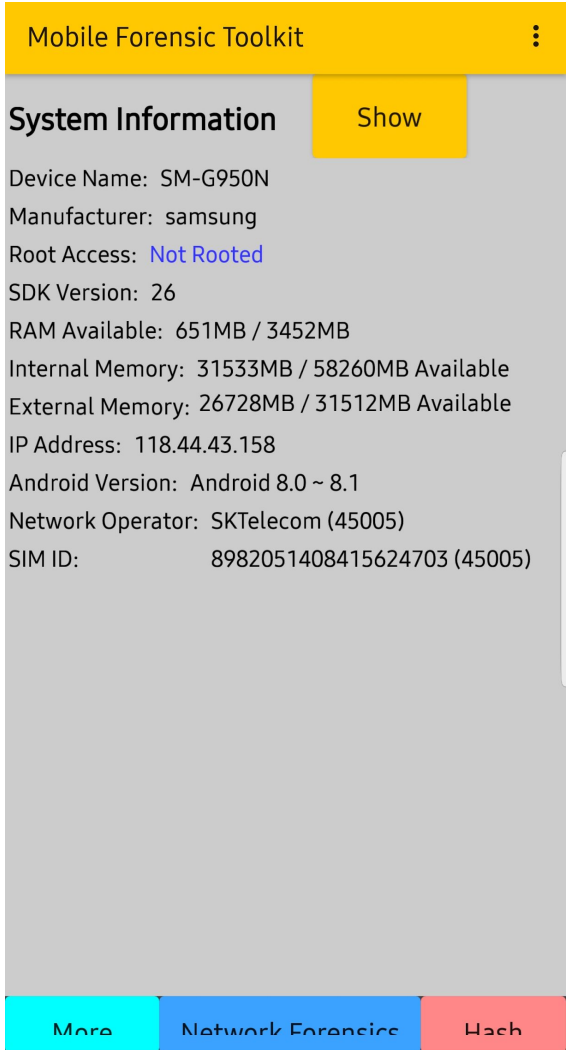
ex) UDP Server 및 System Log의 경우 추가 비용을 지불해야 함.
(실제 기능에서 배제)


when btn_OpenSysInfo .Click
do if call RootChecker1 .IsRooted = false
then set lblroot1 . Text to " Not Rooted "
set lblroot1 . TextColor to
else set lblroot1 . Text to " Rooted "
set lblroot1 . TextColor to
set lblversion . Text to PhoneInfo1 . AndroidAPI
set lblram . Text to join call MemoryInfo1 .MemoryFree
" MB / "
call MemoryInfo1 .MemoryTotal
" MB "
set lblname . Text to PhoneInfo1 . DeviceModel
set lblmaker . Text to PhoneInfo1 . DeviceManufacturer
set lblinternal . Text to join round call MemoryInfo1 .InternalStorageAvailable / 1000000
" MB / "
round call MemoryInfo1 .InternalStorageTotal / 1000000
" MB Available "
set lblexternal . Text to join round call MemoryInfo1 .InternalStorageUsed / 1000000
" MB / "
round call MemoryInfo1 .ExternalStorageAvailable / 1000000
" MB Available "
if


if PhoneInfo1 . AndroidAPI ≤ 7
then set lblandroid . Text to " Android 2.1 or Under "
else if PhoneInfo1 . AndroidAPI = 8
then set lblandroid . Text to " Android 2.2 "
else if PhoneInfo1 . AndroidAPI ≤ 10
then set lblandroid . Text to " Android 2.3 ~ 2.3.7 "
else if PhoneInfo1 . AndroidAPI ≤ 13
then set lblandroid . Text to " Android 3.0 ~ 3.2 "
else if PhoneInfo1 . AndroidAPI ≤ 15
then set lblandroid . Text to " Android 4.0 ~ 4.0.4 "
else if PhoneInfo1 . AndroidAPI ≤ 18
then set lblandroid . Text to " Android 4.1 ~ 4.3 "
else if PhoneInfo1 . AndroidAPI ≤ 20
then set lblandroid . Text to " Android 4.4 "
else if PhoneInfo1 . AndroidAPI ≤ 22
then set lblandroid . Text to " Android 5.0 ~ 5.1 "
else if PhoneInfo1 . AndroidAPI ≤ 23
then set lblandroid . Text to " Android 6.0 "
else if PhoneInfo1 . AndroidAPI ≤ 25
then set lblandroid . Text to " Android 7.0 ~ 7.1.2 "
else if PhoneInfo1 . AndroidAPI ≤ 27

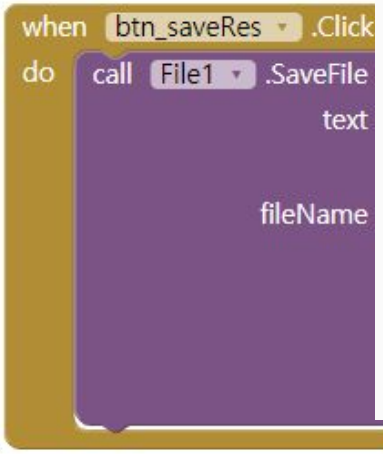

when Specific .BackPressed
do close screen

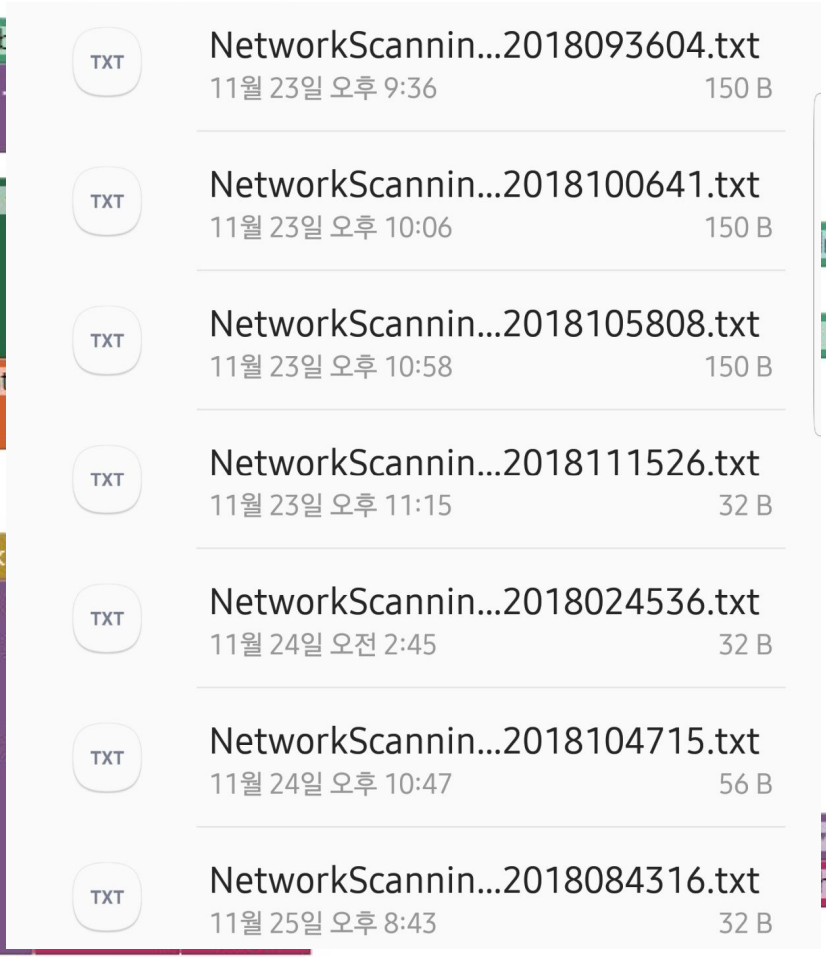
when Specific .Initialize
do set lbl_kernel . Text to SpecialTools1 . KernelVersion
set lbl_buildnumber . Text to SpecialTools1 . BuildNumber
set lbl_baseband . Text to SpecialTools1 . BasebandVersion
set lbl_bootloader . Text to SpecialTools1 . BootloaderVersion
set lbl_serial . Text to SpecialTools1 . SerialNumber
set lbl_country . Text to SpecialTools1 . CountryCode
set lbl_lang . Text to SpecialTools1 . LanguageCode

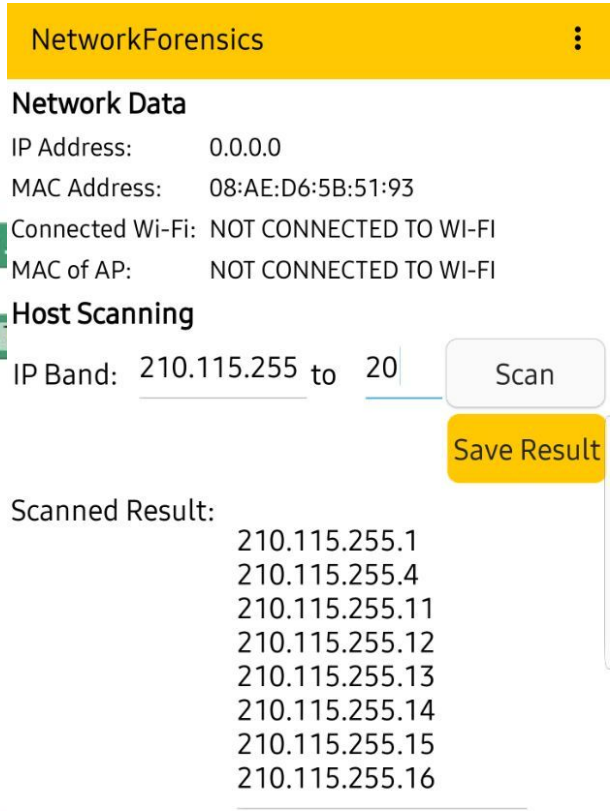


Kernel Version:	4.4.111-14502969-QB200
Build Number:	R16NW.G950NKSU3CRJ1
Baseband Version:	G950NKOU3CRJ1
Bootloader Version:	G950NKSU3CRJ1
Serial Number:	ce10171abab0001e04
Country Code:	KR
Language Code:	ko

when btnScan .Click
do if is empty
then call Notifier1
else set txtboxResult
set global net_Dat

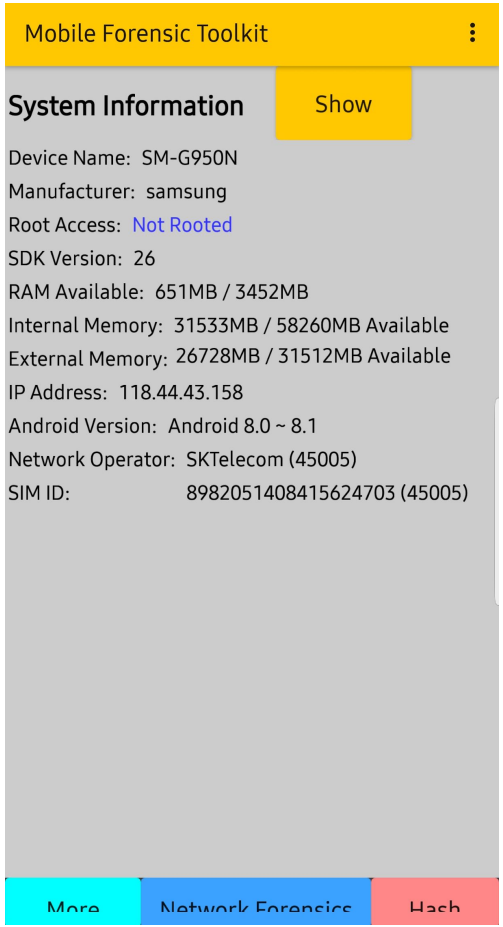

when btn_saveRes .Click
do call File1 .SaveFile
text
fileName

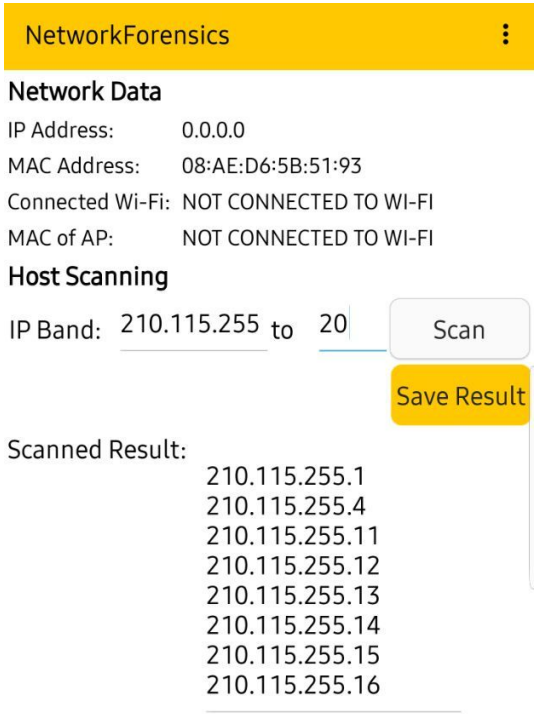

TXT
NetworkScannin...2018093604.txt
11월 23일 오후 9:36
150 B
TXT
NetworkScannin...2018100641.txt
11월 23일 오후 10:06
150 B
TXT
NetworkScannin...2018105808.txt
11월 23일 오후 10:58
150 B
TXT
NetworkScannin...2018111526.txt
11월 23일 오후 11:15
32 B
TXT
NetworkScannin...2018024536.txt
11월 24일 오전 2:45
32 B
TXT
NetworkScannin...2018104715.txt
11월 24일 오후 10:47
56 B
TXT
NetworkScannin...2018084316.txt
11월 25일 오후 8:43
32 B


NetworkForensics
Network Data
IP Address: 0.0.0.0
MAC Address: 08:AE:D6:5B:51:93
Connected Wi-Fi: NOT CONNECTED TO WI-FI
MAC of AP: NOT CONNECTED TO WI-FI
Host Scanning
IP Band: 210.115.255 to 20
Scan
Save Result
Scanned Result:
210.115.255.1
210.115.255.4
210.115.255.11
210.115.255.12
210.115.255.13
210.115.255.14
210.115.255.15
210.115.255.16

네트워크 포렌식 구동 영상

https://www.youtube.com/watch?v=JxvV8Mkxl2E&feature=youtu.be





THANK YOU!

lotsofstars1995@gmail.com

정보법과학연구집단
LEGAL INFORMATICS AND FORENSIC SCIENCE