CSE-605 Checkpoint 1

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Contents

1 TODO Introduction

We will measure the predictability of Android. How far ordinary Android system between Real-time system.

2 TODO Android Components

- Intents and Intent Filters We will evaluate intent delivery mechanism of Android. The intents will appear for almost all multiple processes experiments.
- Activities
- App Widgets

  We will not directly evaluate activities and app widgets because they're only related with UI, it's hard to produce convincible result because there're too many elements out of control, like the GPU power, the screen resolution.

- Services

  We will not directly evalute services as well. The reason is same as activities.

- Content Providers

  We will evalute content providers related **Garbage Collector**, **Synchronization**, and **Scheduler**. Because it's shared data mechanism Android provied.

- Processes and Threads We will evaluate processes and threads directly. They're both our targets and mechanisms to use.

3 Intents/Intent Filters

3.1 Single Process

No, one process doesn't make sense?

3.2 Multiple Processes

We can use process(es) to generate bunch of intents, then use other process(es) to receive the intents. So we can evaluate the order and time of intent delivery. It can provide some pressure for **Garbage Collector**, **Synchronization**, and **Scheduler**.

3.2.1 Garbage Collector

We can use one sender and one receiver to test Garbage Collector, we can associate different size objects with intents. Then the receiver decide how to release those objects. So we can evaluate how garbage collector works:

- frequency of grabage collection and memory pressure
- running time of grabage collection and memory pressure

The memory pressure should contains different types:

	big objects	medium objects	small objects
long live time			
short live time			

3.2.2 Synchronization

This may need other Android components. Because we can not pass an object as extra of an intent, we need serialize the object first. So there no directly synchronized mechanism between intent and receiver, but we can pass some meta data to let receivers use something need synchronization like **Content Provider**.

3.2.3 Scheduler

We can use multiple processes to generate intents for multiple receivers. So the scheduler will get pressure, then we use the order of intent delivery to evaluate scheduler and intent delivery mechanism.

4 TODO Content Providers

5 TODO Processes/Threads

6 Parcelable/Serializable

According to this blog, parcelable mechanism have 10 times better performance than serializable mechanism. But parcelable need developers to implement writeToParcel and createFromParcel manually. So parcelable can save the overhead to iterate all fields of object. But we can compare the two mechanisms by how much pressure they generate to garbage collector.

The approach is to pass same amount of objects from one process to another process (either the same process or alien), then we compare the different behaviors of garbage collector. It's possible to evaluate scheduler as well.