

# Supplementary Materials: Survey Instruments

Double Blind Paper Submission

## I. SURVEY 1 INSTRUMENT

### A. Operating system

**Q 1.** What is your current mobile phone's operating system?

☐ iOS (For iPhones) ☐ Android

*Based on answer to this question, iOS respondents will answer Section I-B and I-D . Android respondents will answer Section I-C and I-E. The other sections remain the same.*

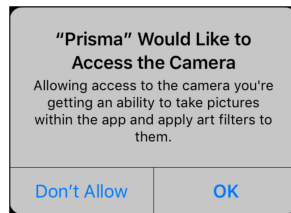
### B. iOS Background

**Q 2.** What are your current phone's model and iOS version? (e.g. iPhone 6s, iOS 12.1.3) (Note: You can find iOS version at Settings > General > About > Version.)

**Q 3.** How many years have you been using iPhone?

☐ less than 3 years ☐ 3 - 7 years ☐ more than 7 years

**Q 4.** Please read the following screen shot from iPhone.



The explanation "Allowing access to the camera you're getting an ability to take pictures within the app and apply art filters to them" is from?

☐ iOS or the system ☐ App developer ☐ I don't know

### C. Android Background

**Q 5.** What is your current phone's make and model?(e.g. Samsung S9) \_\_\_\_\_

**Q 6.** What is your current Android version? (You can find this information under Settings > About Phone > Android Version)

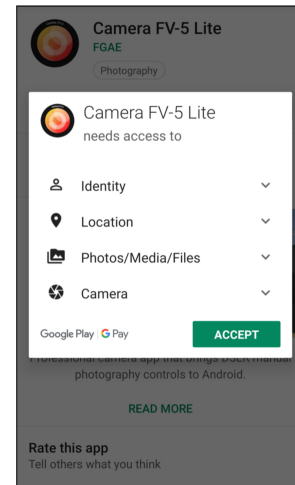
☐ Below 6.0 ☐ 6.0 - ☐ 7.0 - ☐ 8.0 - ☐ 9.0 -

*If below 6.0 is selected, survey will end immediately.*

**Q 7.** How many years have you been using Android?

☐ less than 3 years ☐ 3 - 7 years ☐ more than 7 years

**Q 8.** Read the following picture captured from app store (e.g. Google Play) when installing an app.



Answer the following questions.

(1) Will this app have access to the listed resources immediately?

☐ Yes ☐ No

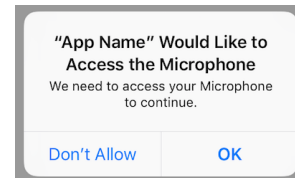
(2) Can you change the permission settings for this app? ☐ Yes ☐ No

(3) Will this app ask again for these permissions when you are using this app? ☐ Yes ☐ No

### D. iOS Comprehension

*Four out of ten questions in this section will be randomly selected for each respondent. "I do not know" and "None of these" are exclusive from other choices.*

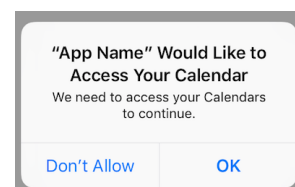
**Q 9** (Microphone). When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click OK? (Choose ALL that apply)

☐ Record your voice when the app is in use ☐ Make a phone call  
☐ Record your voice when the app is running in background ☐ Read your photos ☐ I do not know ☐ None of these

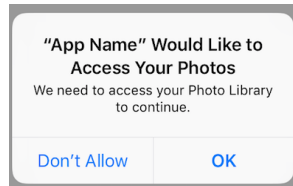
**Q 10** (Calendar). When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click OK? (Choose ALL that apply)

- ☐ Send SMS ☐ Read your calendar ☐ Save events to your calendar  
☐ Make phone calls ☐ I do not know ☐ None of these

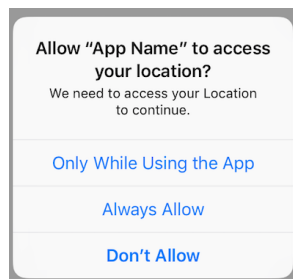
**Q 11 (Photo).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click OK? (Choose ALL that apply)

- ☐ Read all photos on the device ☐ Read all files on the device ☐ Delete photos on the device ☐ Delete any files on the device ☐ I do not know ☐ None of these

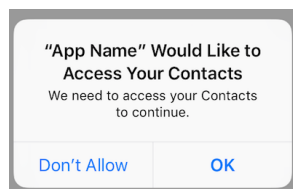
**Q 12 (Location).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click Always Allow? (Choose ALL that apply)

- ☐ Read your current location when you are using the app ☐ Make phone calls ☐ Read your current location when the app is running in background ☐ Read your photos ☐ I do not know ☐ None of these

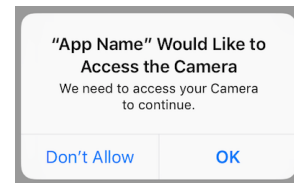
**Q 13 (Contact).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click OK? (Choose ALL that apply)

- ☐ Read your location ☐ Read your contacts ☐ Save new contact to your phone ☐ Make phone calls ☐ I do not know ☐ None of these

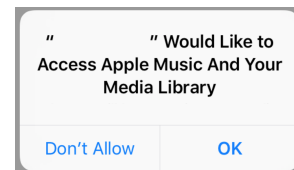
**Q 14 (Camera).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click OK? (Choose ALL that apply)

- ☐ Read your location ☐ Take pictures and record videos ☐ Read all pictures and videos ☐ Read your contact ☐ I do not know ☐ None of these

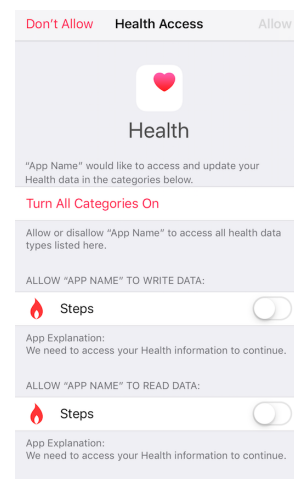
**Q 15 (Media).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click OK? (Choose ALL that apply)

- ☐ Record your voice ☐ Play music in your media library ☐ Edit your play list in apple music ☐ Take pictures and store videos ☐ I do not know ☐ None of these

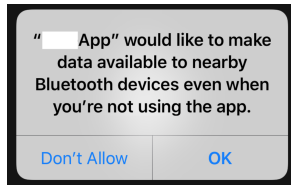
**Q 16 (Health).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click Turn All Categories On? (Choose ALL that apply)

- ☐ Read your steps count ☐ Read your heart rate ☐ Store your steps count ☐ Read your workouts history ☐ I do not know ☐ None of these

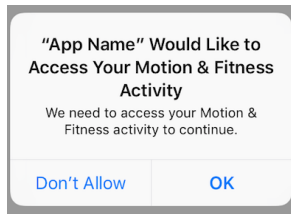
**Q 17 (Bluetooth).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click Ok? (Choose ALL that apply)

- ☐ Scan the list of nearby bluetooth devices ☐ Read your messages  
☐ Exchange data with connected bluetooth devices ☐ Make phone calls ☐ I do not know ☐ None of these

**Q 18 (Motion).** When you are using an app and it prompts a dialog that says,



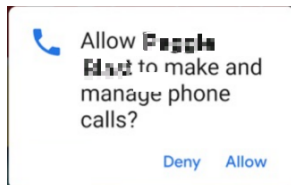
Which of the following will this app be allowed to do after you click Ok? (Choose ALL that apply)

- ☐ Read your running history ☐ Read the information from body sensors on your phone (e.g. gyroscopes) ☐ Read your contacts ☐ Read your steps count ☐ I do not know ☐ None of these

### E. Android Comprehension

Four out of ten questions in this section will be randomly selected for each respondent. "I do not know" and "None of these" are exclusive from other choices.

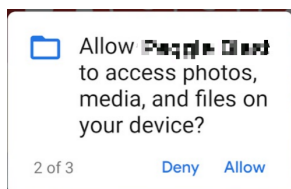
**Q 19 (Phone).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click allow? (Choose all that apply.)

- ☐ Get your phone number ☐ Read your calendar ☐ Get your phone unique ID (e.g. IMEI) ☐ Make phone call ☐ Read your location  
☐ Answer phone call ☐ Know whether the phone is making a phone call ☐ Read call history ☐ I do not know ☐ None of these

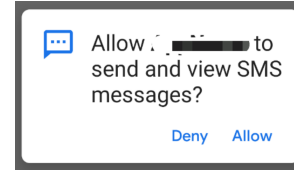
**Q 20 (Storage).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click allow? (Choose all that apply.)

- ☐ Make phone call ☐ Read this app's photos, media, and files ☐ Read other app's photos, media, and files ☐ Save new photos, media, and files ☐ Read your location ☐ I do not know ☐ None of these

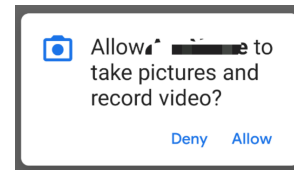
**Q 21 (SMS).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click allow? (Choose ALL that apply)

- ☐ Read your location ☐ Read your SMS messages ☐ Make phone calls ☐ Send SMS messages ☐ I do not know ☐ None of these

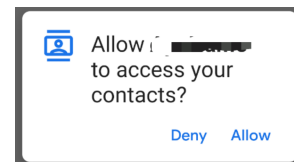
**Q 22 (Camera).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click allow? (Choose ALL that apply)

- ☐ Read your location ☐ Read pictures and videos ☐ Take pictures and record videos ☐ Read your contact ☐ I do not know ☐ None of these

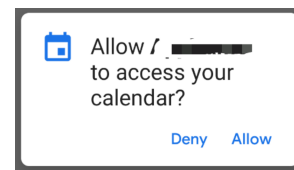
**Q 23 (Contact).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click allow? (Choose ALL that apply)

- ☐ Read your location ☐ Read your contact list ☐ Read your Google account email address ☐ Make phone calls ☐ Save new contact to your phone ☐ I do not know ☐ None of these

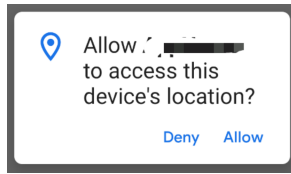
**Q 24 (Calendar).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click allow? (Choose ALL that apply)

☐ Make phone calls ☐ Read your calendar ☐ Send SMS ☐ Save events to your calendar ☐ I do not know ☐ None of these

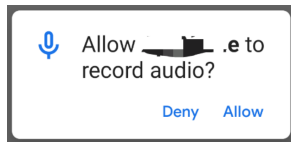
**Q 25 (Location).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click allow? (Choose ALL that apply)

☐ Make phone calls ☐ Read your current location ☐ Read your photos ☐ I do not know ☐ None of these

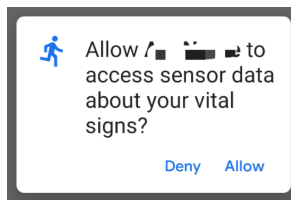
**Q 26 (Microphone).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click allow? (Choose ALL that apply)

☐ Access your calendar ☐ Record your voice ☐ Record your voice when the app is in background ☐ Read your photos ☐ I do not know ☐ None of these

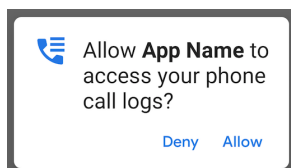
**Q 27 (Sensor).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click allow? (Choose ALL that apply)

☐ Read your fingerprints ☐ Read your heart rate history ☐ Read your step count ☐ Read your face ID ☐ I do not know ☐ None of these

**Q 28 (Call).** When you are using an app and it prompts a dialog that says,



Which of the following will this app be allowed to do after you click allow? (Choose ALL that apply)

☐ Read your call history ☐ Get your phone number ☐ Get all your contacts ☐ Save new call log ☐ Get the phone number being dialed when you are making a phone call ☐ I do not know ☐ None of these

## F. Experience

**Q 29.** How often do you meet permission prompts in apps that make you feel uncomfortable?

☐ Never ☐ Rarely ☐ Sometimes ☐ Frequently ☐ Always

**Q 30.** Do you live on earth?

☐ Yes ☐ No

If No is selected, survey will end immediately.

**Q 31.** Display if any of the last four from Q. 29 was selected. Provide an example of meeting uncomfortable permissions in previous question. (e.g. An game app asks for external storage permission)

**Q 32.** Display if any of the last four from Q. 29 was selected. What do you do with the app if an app keeps asking for permissions that you do not feel comfortable with?

☐ Allow the permission request ☐ Deny the permission requests every time ☐ Choose do not ask again in the permission dialog and deny it ☐ Uninstall the app ☐ I have met this before. ☐ I don't understand this question ☐ Other: \_\_\_\_\_

**Q 33.** Display if the first of Q. 32 was selected. If you choose to allow the permissions, what are the reasons?

☐ I have to use that app for a specific purpose. ☐ I trust the app's developer. ☐ The app will crash without the requested permission. ☐ I have get used to the app. ☐ I do not care. ☐ Other: \_\_\_\_\_

**Q 34.** This picture is captured from the app store (Google Play) on Android 9.0. How often do you read the app permissions list inside the app store (e.g. Google Play) before installing the app?

☐ I have never seen this before in app store. ☐ I don't know how to find the permission list in app store ☐ Never ☐ Seldom ☐ About half of time ☐ Usually ☐ Always ☐ Only for apps that I install for the first time

**Q 35.** Display if any of last five from Q. 34 was selected. Describe the detailed process to find application permission list in app store (e.g. Google Play). \_\_\_\_\_

## G. Demographics

**Q 36.** What is your gender?

☐ Female ☐ Male

**Q 37.** How old are you?

☐ 18 - 24 years. ☐ 25 - 34 years. ☐ 34 - 45 years. ☐ 45 - 54 years. ☐ 54 - 64 years ☐ 64 years or older.

**Q 38.** What is the highest level of education that you completed?

☐ Less than high school degree ☐ High school degree or equivalent ☐ Some college/Technical Certificate ☐ Associates degree ☐ Bachelor's degree ☐ Master's degree ☐ Doctorate degree ☐ Other (Please specify): \_\_\_\_\_

**Q 39.** How would you rate your knowledge about mobile privacy and security?

☐ No knowledge ☐ Mildly knowledgeable ☐ Moderately knowledgeable ☐ Highly knowledgeable ☐ Expert

**Q 40.** Are you majoring in, hold a degree in, or have held a job in any of the following fields: computer science; computer engineering; information technology; or a related field?

☐Yes ☐No

**Q 41.** Are you a native speaker?

☐Yes ☐No

**Q 42.** What is your current occupation field?

☐I currently do not have a job. ☐Student ☐I live on income from Amazon Mechanical Turk ☐Retail (e.g. salespeople, cashier) ☐Office clerks ☐Truck drivers ☐Restaurants (e.g. waiter, food prep) ☐Farmers ☐General Managers ☐Health Care (e.g. Nurses) ☐Business and Finance (e.g. Accounting, marketing) ☐Information Technology (e.g. Software Engineer) ☐Retired ☐Miscellaneous

**Q 43** (Optional). If you want to receive a summary of our research, please leave your email address.

## II. SURVEY 2 INSTRUMENT

### A. Operating System

**Q 1.** What is your current mobile phone's operating system?

☐iOS (For iPhones) ☐Android

*Based on answer to this question, iOS respondents will answer Section II-B. Android respondents will answer Section II-C. The other sections remain the same.*

### B. iOS Background

**Q 2.** What are your current phone's model and iOS version? (e.g. iPhone 6s, iOS 12.1.3) (Note: You can find iOS version at Settings > General > About > Version.)

**Q 3.** How many years have you been using iPhone?

☐less than 3 years ☐3 - 7 years ☐more than 7 years

### C. Android Background

**Q 4.** What is your current phone's make and model?(e.g. Samsung S9) \_\_\_\_\_

**Q 5.** What is your current Android version? (You can find this information under Settings > About Phone > Android Version)

☐Below 6.0 ☐6.0 - ☐7.0 - ☐8.0 - ☐9.0 -

*If below 6.0 is selected, survey will end immediately.*

### D. Scenario Experience

*Each respondent will answer three scenarios with information for the same factor.*

The order of the three scenarios is randomized. Scenario 1: Felp (Contact).

**Q 6.** You installed a restaurant rating and review app named Felp. Felp can help you find good restaurants around you, and read the menu and other users' reviews for the restaurant. When you are using Felp, it asks for contact permission. Will you allow this permission request?

☐Yes, I will allow. ☐No, I will not.

**Q 7.** Rate your confidence in answering the previous question.

TABLE I: Factors and their messages displayed in permission dialogs in scenarios. App is the simulated app name and Resource is the permission group name that an app requests.

Factors	Messages
Background access	Resource may be accessed when you're not using the app.
Data transmission	Resource may be transmitted outside your phone.
Ratings	The rating of App is 2.1 rating in app store.
Reviews	App has 13 reviews related to Resource in app store. One example is "Why App needs my Resource? Intrusive and unnecessary permission invasion of privacy!".
Grant rate	20% of App users granted Resource access.
Brand reputation	App is developed by a reputable company.

☐Very confident ☐Somewhat confident ☐Neutral ☐Somewhat unconfident ☐Not confident at all

*Page Break here. Respondents cannot go back.*

**Q 8.** Suppose now, a trustworthy Phone company provides a service that the permission prompt dialogs are customized to incorporate more information, which is collected from all phone users of this company.

*In the following scenario, the Phone company provides you with the information that [Insert factor description].*

You installed a restaurant rating and review app named Felp. Felp can help you find good restaurants around you, and read the menu and other users' reviews for the restaurant.

(Insert screen picture of permission request with extra information with factor.)



Fig. 1: Figures will be shown based on the operating system. The text message for decision factor in the figure will be substituted based on the survey's decision factor as shown in Table I.

When you are using Felp, it asks for contact permission. According to the statistics provided by phone company, Felp [Insert factor

description].

Will you allow this permission request?

☐ Yes, I will allow. ☐ No, I will not.

**Q 9.** Rate your confidence in answering the previous question.

☐ Very confident ☐ Somewhat confident ☐ Neutral ☐ Somewhat unconfident ☐ Not confident at all

**Q 10.** Explain your reasons why you make such decisions.

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*Page Break here. Respondents cannot go back.*  
Scenario 2: RShare (Calendar).

**Q 11.** In the following questions, you are considering the following scenario. You installed an app to find carpools named RShare. RShare can help you find a ride and carpool if you don't have a car. You can search for your destinations and find suitable ride.

When you are using RShare, it asks for calendar permission. Will you allow this permission request?

☐ Yes, I will allow. ☐ No, I will not.

**Q 12.** Rate your confidence in answering the previous question.

☐ Very confident ☐ Somewhat confident ☐ Neutral ☐ Somewhat unconfident ☐ Not confident at all

*Page Break here. Respondents cannot go back.*

**Q 13.** Suppose now, a trustworthy Phone company provides a service that the permission prompt dialogs are customized to incorporate more information, which is collected from all phone users of this company.

In the following scenario, the Phone company provides you with the information that [Insert factor description].

You installed an app to find carpools named RShare. RShare can help you find a ride and carpool if you don't have a car. You can search for your destinations and find suitable ride.

(Insert screen picture of permission request with extra information with factor.)

When you are using RShare, it asks for calendar permission. , according to the statistics provided by phone company, RShare [Insert factor description].

Will you allow this permission request?

☐ Yes, I will allow. ☐ No, I will not.

**Q 14.** Rate your confidence in answering the previous question.

☐ Very confident ☐ Somewhat confident ☐ Neutral ☐ Somewhat unconfident ☐ Not confident at all

**Q 15.** Explain your reasons why you make such decisions.

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Scenario 3: LCGE (Local Gas& Energy) (Location).

**Q 16.** In the following questions, you are considering the following scenario. You installed an app to help you pay your electronic bills and utility fees named LCGE (LC Gas & Energy). LCGE can help you view your current energy usage and fees, make payments or schedule a payment on your mobile phone.

When you are using LCGE, it asks for location permission. Will you allow this permission request?

☐ Yes, I will allow. ☐ No, I will not.



Fig. 2: Figures will be shown based on the operating system. The text message for decision factor in the figure will be substituted based on the survey's decision factor as shown in Table I.

**Q 17.** Rate your confidence in answering the previous question.

☐ Very confident ☐ Somewhat confident ☐ Neutral ☐ Somewhat unconfident ☐ Not confident at all

*Page Break here. Respondents cannot go back.*

**Q 18.** Suppose now, a trustworthy Phone company provides a service that the permission prompt dialogs are customized to incorporate more information, which is collected from all phone users of this company.

In the following scenario, the Phone company provides you with the information that [Insert factor description].

You installed a app to help you pay your electronic bills and utility fees named LCGE (LC Gas & Energy). LCGE can help you view your current energy usage and fees, make payments or schedule a payment on your mobile phone.

(Insert screen picture of permission request with extra information with factor.)

When you are using LCGE, it asks for location permission. According to the statistics provided by phone company, LCGE [Insert factor description].

Will you allow this permission request?

☐ Yes, I will allow. ☐ No, I will not.

**Q 19.** Rate your confidence in answering the previous question.

☐ Very confident ☐ Somewhat confident ☐ Neutral ☐ Somewhat unconfident ☐ Not confident at all

**Q 20.** Explain your reasons why you make such decisions.

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**Q 21.** Based on the previous questions, how helpful is the information that [Insert factor description] when you are making decisions for the permission request?



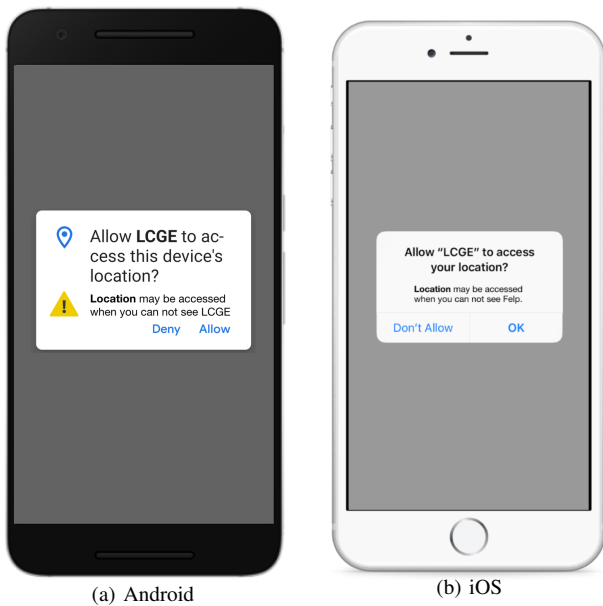


Fig. 3: Figures will be shown based on the operating system. The text message for decision factor in the figure will be substituted based on the survey's decision factor as shown in Table I.

☐Very helpful ☐Somewhat helpful ☐Neutral ☐Not helpful ☐Not helpful at all

**Q 22.** Explain your reasons. \_\_\_\_\_

#### E. Factors

**Q 23.** How often do you read app reviews before installing the app?

☐Never ☐Rarely ☐Sometimes ☐Frequently ☐Always ☐Only for apps that I install for the first time

**Q 24.** How many reviews will you check before installing the app?

☐I do not check ☐Only the reviews displayed by default ☐Less than or equal to 10 ☐More than 10

**Q 25.** How many reviews will you check before installing the app?

☐I do not check ☐Only the reviews displayed by default ☐Less than or equal to 10 ☐More than 10

**Q 26.** How likely will the following reviews from app store will stop you from installing the app?

Rate the following conditions in ☐certainly ☐probable ☐chances about even ☐probably not ☐impossible.

- (1) "It quits abnormally when you enter the navigations, ..."
- (2) "The message function does not work at all ..."
- (3) "This is a total FAKE app, the descriptions are not true at all."
- (4) "Why this app want my contact??? Too many permissions ..."
- (5) "This app will collect and sell your information! ..."

**Q 27.** How comfortable do you feel with apps requesting access the following resources, if you know that they may transmit them outside your phone then store remotely?

Rate the following resources in ☐Very uncomfortable ☐Somewhat uncomfortable ☐Neutral ☐Somewhat comfortable ☐Very comfortable

- (1) Contacts (2) Calendar (3) Location (4) Microphone (5) Photos

**Q 28.** Will an app developed by a famous company (e.g. Google) increase your chances of granting permission?

☐Yes ☐No

**Q 29.** When you make decisions for app permission requests (e.g. Location, contact, calendar), what factors do you consider most helpful?

All the following information provided by a trusted phone company. (Choose no more than 3 factors, rank the most important one first)

- (1) App's ratings
- (2) Percentage of users for this app granted the permission
- (3) Other users' reviews related to the permission of this app
- (4) Whether the app will access data when app is not visible
- (5) Whether this app is developed by a famous company
- (6) Whether the information will be transferred outside of your phone

**Q 30 (Optional).** What else factors do you consider when you make decisions for app permission requests? (If any)

#### F. Demographics

The demographics section in this survey is the same as Survey 1 demographics section §I-G.