



Creative Competence of App Inventor Programming

MIT App Inventor 2 Examination Paper

Exam instructions

1. This exam contains of knowledge exam and practical exam. Maximum time allowed for this exam is 120 minutes. Please finish all the requirements with the exam time. The full mark means 100 points and you will pass the exam with at least 70-points.
2. There are 40 minutes allocated to multiple-choice/multiple-answer questions and 80 minutes allocated to practical programming questions.
3. There are 20 multiple-choice/multiple-answer questions of knowledge exam, 1 point is given for each correct answered question, 20 points is allocated to knowledge exam. Practical programming questions in this exam; 20 points are allocated to the 1st question and 30 points to the 2nd and 3rd questions, 80 points is allocated to practical exam.
4. Questions will be displayed on the screen directly. When the time allowed for multiple-choice questions is up, the answers you selected will be saved automatically, and you will not be allowed to change the answer further more.
5. All the necessary files are located in respective folders under C:\ANS.CSF\. Please follow the instructions to save your files in respective folders under C:\ANS.CSF\ and close the MIT App Inventor IDE.
6. Please notice that the markings of each hands-on question are related to each other. Components' properties or other settings which are not clearly asked by the instruction are kept as its original state.
7. While reading the question instructions, please notice that "0" means the number zero and "O" means the corresponding alphabet. The mouse is set as the right-handed user. Mouse button settings are for right-handed.
8. If you have any questions, please raise your hand and ask questions. Do not talk privately.

- Knowledge exam 20% (There are multiple-choice/multiple-answer questions of knowledge exam, 1 point is given for each correct answered question.)
Follow the instructions of each question to finish the knowledge segment.

01. Which of the following properties can disable components (such as Button, DatePicker)?
 - (A) Check the Enabled property
 - (B) Uncheck Enabled property
 - (C) Check the Visible property
 - (D) Uncheck the Visible property
02. Which of the following components can perform data transmission and reception on the network? (more than one answer)
 - (A) WebView component
 - (B) Web component
 - (C) TinyWebDB component
 - (D) Image component
03. Which of the following components can be used to scan a barcode or a QR-code?
 - (A) Camera component
 - (B) BarcodeScanner component
 - (C) NxtColorSensor component
 - (D) OrientationSensor component
04. Which of the following components can be used if you want to keep the data after the program is closed?
 - (A) ListPicker component
 - (B) TextBox component
 - (C) Texting component
 - (D) TinyDB component

05. Which of the following methods can't create the .apk installation file? (more than one answer)
- (A) Build menu / App (provide QR code for .apk)
 - (B) Build menu / App (save .apk to my computer)
 - (C) Connect menu / Emulator
 - (D) Projects menu / Export selected project (.aia) to my computer
06. Which of the following options can import the .aia source into my App Inventor development environment? (more than one answer)
- (A) Build menu / App (provide QR code for .apk)
 - (B) Projects menu / Import projects (.aia) from my computer
 - (C) Projects menu / Export selected project (.aia) to my computer
 - (D) Projects menu / Import projects (.aia) from a repository...
07. Which of the following components can be used to access the specified file path on an Android device?
- (A) TinyDB component
 - (B) File component
 - (C) TinyWebDB component
 - (D) WebViewer component
08. According to the blocks below, how many items are available after pressing the ListPicker1?
- (A) 0
 - (B) 1
 - (C) 5
 - (D) 3
09. According to the blocks below, when Button1 is clicked, what is the result on Label1?
- (A) 10
 - (B) 11
 - (C) 12
 - (D) 13

10. According to the blocks below, when Button1 is clicked, what is the result on Label1?
- (A) hello
 - (B) Hello
 - (C) HELLO
 - (D) Ahello
11. According to the blocks below, when Button1 is clicked, what is the result on Label1?
- (A) Display the webpage video format of the website
`http://www.appinventor.tw/`
 - (B) Display the webpage image format of the website
`http://www.appinventor.tw/`
 - (C) Display the webpage source code of the website
`http://www.appinventor.tw/`
 - (D) Display the webpage respond code of the website
`http://www.appinventor.tw/`
12. According to the blocks below, when Button1 is clicked, what is the result on Label1?
- (A) 3
 - (B) 10
 - (C) 11
 - (D) 13
13. According to the blocks below, what is the time interval for the text of Label1 to change?
- (A) 2ms
 - (B) 1.8s
 - (C) 2s
 - (D) The text of Label1 will never change
14. Which of the following math blocks can round a float number to an integer?
- (A) random fraction
 - (B) round
 - (C) sqrt
 - (D) abs

15. As the image below, which of the following parameter value will change when the phone is rotating around the x-axis?
- (A) Pitch
 - (B) Roll
 - (C) Azimuth
 - (D) Magnitude
16. Which of the following is the unit of measurement used by the Proximity Sensor?
- (A) Meter
 - (B) Foot
 - (C) Inch
 - (D) Centimeter
17. Which of the following description is correct about the Texting component?
(more than one answer)
- (A) It is a visible component
 - (B) It belongs to the Social category
 - (C) There is an interface for entering text
 - (D) It has a SendMessage function
18. Which of the following description are correct about the NearField component? (more than one answer)
- (A) It is an invisible component
 - (B) Currently App Inventor only supports the reading and writing of text tags
 - (C) This feature is available on all Android devices
 - (D) It can be set to read mode or write mode
19. How does App Inventor control the LEGO robot?
- (A) USB cable
 - (B) Wifi
 - (C) Bluetooth
 - (D) NFC

20. If you want to make an app to determine where you are facing, which of the following attribute of OrientationSensor component is used to determine the orientation?

(A) Azimuth

(B) Pitch

(C) Roll

(D) Angle

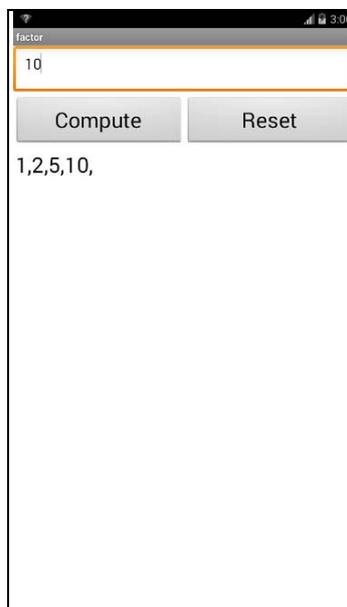
- Practical exam 80% (20 points are allocated to the 1st question.30 points for each question from the 2nd question to the 3rd question.)

1. Finding all the factors

A. Question description:

Please open the **MID01.aia** in your App Inventor IDE and finish this app. Input a number in the Textbox and all the factors of this input number will be shown when the “**Compute**” button is pressed. Another prompt for the error messages will show up if the input is incorrect. Please follow the instructions below to finish this app and save the file as **MID01.apk**. Finally, please download the .aia and the .apk file of this question and save them in the corresponding folder under C:\ANS.CSF.

Note: all the necessary components are pre-added in the MID01.aia.



< Illustrative layout >

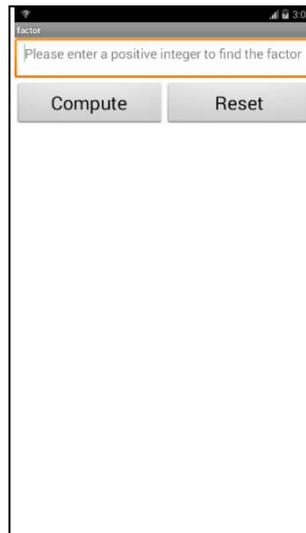
B. Program specs:

- (1) As in the **Designer** page, all the necessary components of this question have been provided, please refer to the image below to finish the layout.
- (2) The two buttons under the **TextBox** component have to be arranged horizontally and fill the whole screen width. Each button's width properties have to be set to 50%.
- (3) When the “**Compute**” button is pressed; all the factors of the input number will be displayed on the **Label** component. The term “**All the factors**” means numbers including 1, the number itself and all possible factors between. Finally, pressed the “**Reset**” button to input another number.

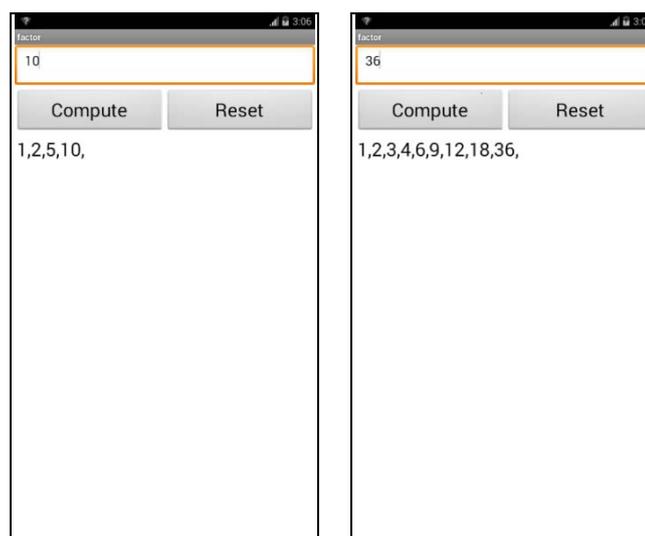
- (4) A prompt will show with the message “**Empty input, decimal numbers and numbers less than or equal to zero are NOT allowed.**” if the “**Compute**” button is pressed when (1) The **TextBox** components has no input at all. (2) The input number is less than or equal to zero. (3) The input number is a decimal number. Finally, clear the text properties of the **TextBox** and the **Label** components.

C. Example screenshots:

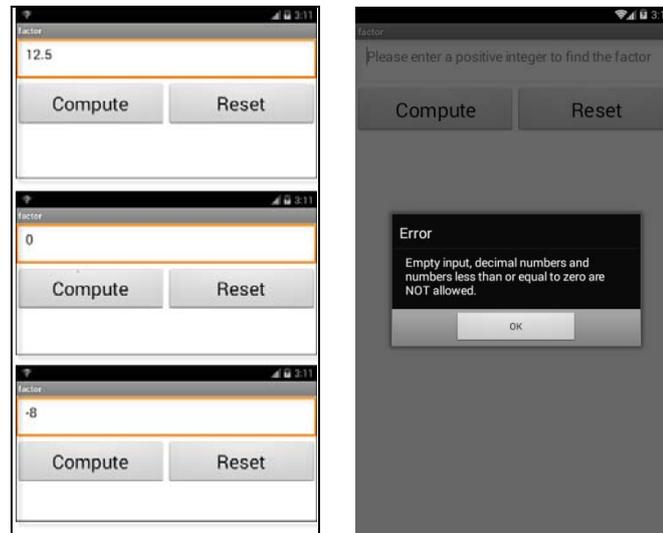
- (1) Start/Initial screen.



- (2) When the “**Compute**” button is pressed; all the factors of the input number will be displayed on the **Label** component. The term “**All the factors**” means numbers including 1, the number itself and all possible factors between. Finally, pressed the “**Reset**” button to input another number.



- (3) A prompt will show with the message “**Empty input, decimal numbers and numbers less than or equal to zero are NOT allowed.**” if the “**Compute**” button is pressed when (1) The **TextBox** components has no input at all. (2) The input number is less than or equal to zero. (3) The input number is a decimal number. Finally, clear the text properties of the **TextBox** and the **Label** components.



D. Test your app:

- (1) The layout is identical (or at least similar to the reference layout). All components' properties are set correctly.
- (2) All the factors of the input number are displayed on the **Label** components after the “**Compute**” button is pressed.
- (3) A prompt will show with the message “**Empty input, decimal numbers and numbers less than or equal to zero are NOT allowed.**” if the “**Compute**” button is pressed when (1) The **TextBox** components has no input at all. (2) The input number is less than or equal to zero. (3) The input number is a decimal number. Finally, clear the text properties of the **TextBox** and the **Label** components.

E. Assessment Criteria:

Criteria	Points	Score
(1) The layout is identical (or at least similar to the reference layout. All components' properties are set correctly.	2	
(2) All the factors of the input number are displayed on the Label components after the " Compute " button is pressed.	12	
(3) A prompt will show with the message " Empty input, decimal numbers and numbers less than or equal to zero are NOT allowed. " if the " Compute " button is pressed when (1) The TextBox components has no input at all. (2) The input number is less than or equal to zero. (3) The input number is a decimal number. Finally, clear the text properties of the TextBox and the Label components.	6	
Total Score	20	

2. Multiplication Challenge

A. Question description:

Please open the **MID02.aia** in your App Inventor IDE and finish this app. After the app is started, there will be a calculation of two numbers' multiplication. Enter the answer and press the “**Submit**” button, the app will tell you whether you have input the right answer. Please follow the instructions below to finish this app and save the file as **MID02.apk**. Finally, please download the .aia and the .apk file of this question and save them in the corresponding folder under C:\ANS.CSF.

Note: all the necessary components are pre-added in the MID02.aia.



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B. Program specs:

- (1) The label (NO1) is the multiplicand and the label (NO2) is the multiplier. These two numbers will be randomly assigned within the range from 2 to 9. The user has to enter the multiplication result in the **TextBox** component.
- (2) The **TextBox** component must be set as “**NumbersOnly**”.
- (3) The app will check whether the input number is correct. If the answer is correct, the total times of the correct-answered questions will be accumulated and show a message “**correct**” on the **Label** component; if not, the total times of the correct-answered questions will not be accumulated and show a message “**wrong**” on the **Label** component.
- (4) Whether the answer is correct or not, the **TextBox** component will be reset to blank and be ready for the next input after the “**Submit**” button is pressed.

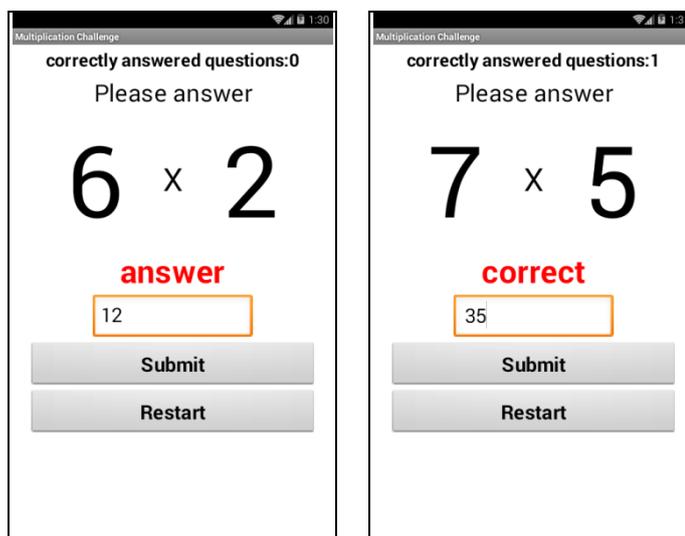
- (5) When the “**Restart**” button is pressed, the total times of the correct-answered questions will be reset to zero; the Text property of the result **Label** component and the **TextBox** component will be reset to blank for the next input.

C. Example screenshots:

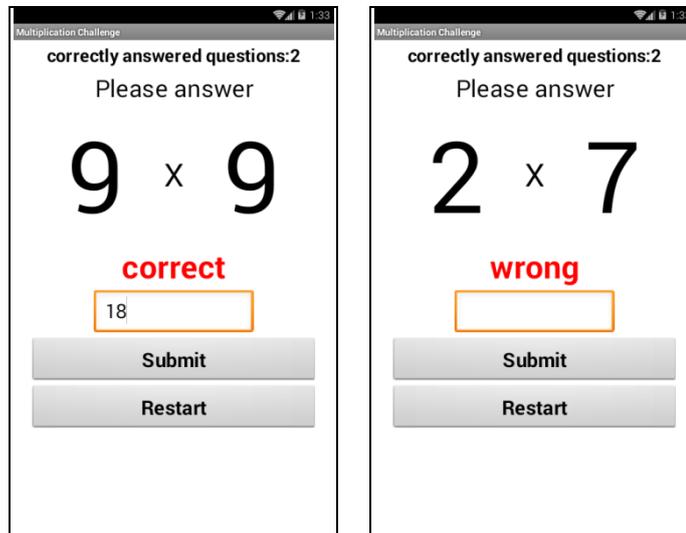
- (1) Start/Initial screen.



- (2) The app will decide whether the input number is correct. If the answer is correct, the total times of the correct-answered questions will be accumulated and show a message “**correct**” on the **Label** component and reset the Text property of the **TextBox** to blank.



- (3) If the answer is incorrect, the total times of the correct-answered questions will not be accumulated and show a message “**wrong**” on the **Label** component.



- (4) When the “**Restart**” button is pressed, the total times of the correct-answered questions will be reset to zero, the **Text** property of the result Label component and the **TextBox** component will be reset to blank for the next input.



D. Test your app:

- (1) The layout is identical (or at least similar) to the reference layout. All components' properties are set correctly.
- (2) The **TextBox** component must be set as “**NumbersOnly**”.
- (3) After the app is started, the multiplicand and the multiplier have to be randomly assigned within the range from 2 to 9.

- (4) After user input the answer, the total times of the correct-answered questions will be accumulated and show a message “**correct**” on the **Label** component if the answer is correct.
- (5) If the answer is not correct, the total times of the correct-answered questions will not be accumulated and show a message “**wrong**” on the **Label** component.
- (6) When the “**Restart**” button is pressed, the total times of the correct-answered questions will be reset to zero, the Text property of the result **Label** component and the **TextBox** component will be reset to blank for the next input.

E. Assessment Criteria :

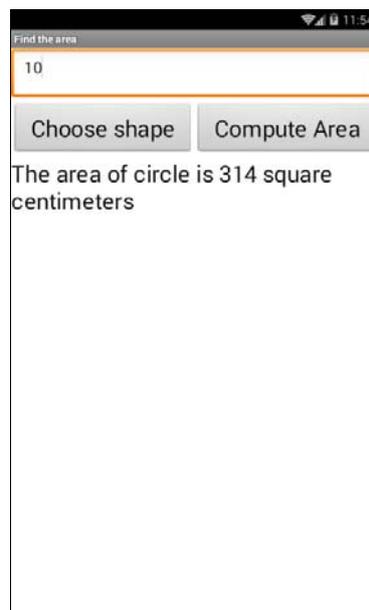
Criteria	Points	Score
(1) The layout is identical (or at least similar) to the reference layout.	3	
(2) The TextBox component must be set as “ NumbersOnly ”.	2	
(3) After the app is started, the multiplicand and the multiplier have to be randomly assigned within the range from 2 to 9.	5	
(4) After user input the answer, the total times of the correct-answered questions will be accumulated and show a message “ correct ” on the Label component if the answer is correct.	10	
(5) If the answer is not correct, the total times of the correct-answered questions will not be accumulated and show a message “ wrong ” on the Label component.	5	
(6) When the “ Restart ” button is pressed, the total times of the correct-answered questions will be reset to zero, the Text property of the result Label component and the TextBox component will be reset to blank for the next input.	5	
Total Score	30	

3. Find the area

A. Question description:

Please open the **MID03.aia** in your App Inventor IDE and finish this app. After the app is started, click the **ListPicker** component to select the area type, including circle, rectangle and triangle. Each type area has its corresponding formula to calculate its area. Please follow the instructions below to finish this app and save the file as **MID03.apk**. Finally, please download the .aia and the .apk file of this question and save them in the corresponding folder under C:\ANS.CSF.

Note: only some of the necessary components are pre-added in the MID03.aia, you may have to add other components on your own.



< Illustrative layout >

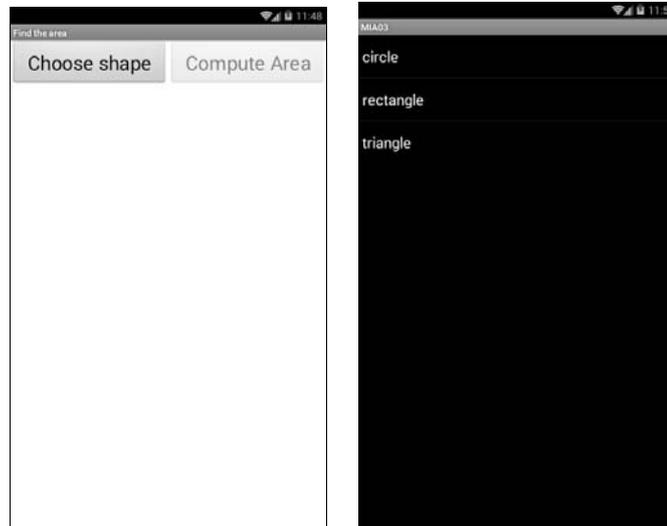
B. Program specs:

- (1) There is a **ListPicker** component on the left-hand side of the screen. Set the elements property of this **ListPicker** component to “circle”, “rectangle” and “triangle”.
- (2) For the two pre-added **TextBox** components, they have to be set as not visible on the screen and show up by the select result of the **ListPicker** component, describing as below:
- (3) Circle: Show one **TextBox** component and its Hint property must be set as “Please input the radius”.
- (4) Rectangle: Show two **TextBox** components and their Hint properties must be set as “Please input the width” and “Please in put the height” respectively.
- (5) Rectangle: Show two **TextBox** components and their Hint properties must be set as “Please input the base” and “Please in put the height” respectively.

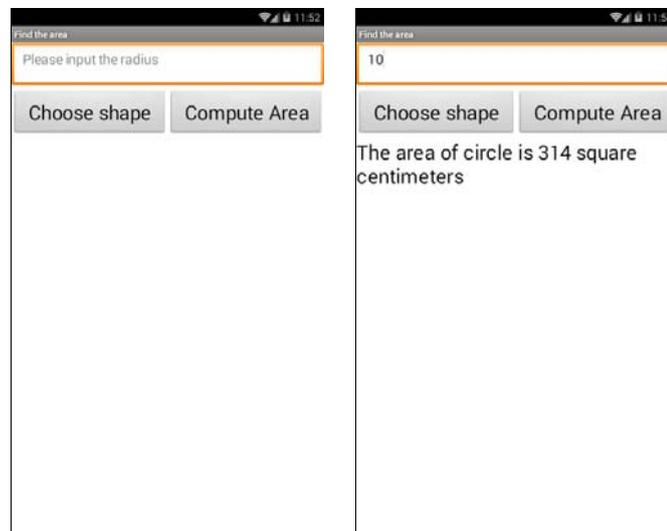
- (6) For the “**Compute Area**” button, this component is set as “not enabled” at the beginning of the program and can only be clicked after the user has selected one of the shape from the **ListPicker** component. Calculated as follows:
- Circle: $\text{radius} \times \text{radius} \times 3.14$
 - Rectangle: $\text{width} \times \text{height}$
 - Triangle: $(\text{base} \times \text{height})/2$
- (7) The result should be displayed on the **Label** component with the format of “The area of XXX is OOO square centimeters”, where XXX is the shape chosen by the user and OOO is the calculation result.

C. Example screenshots:

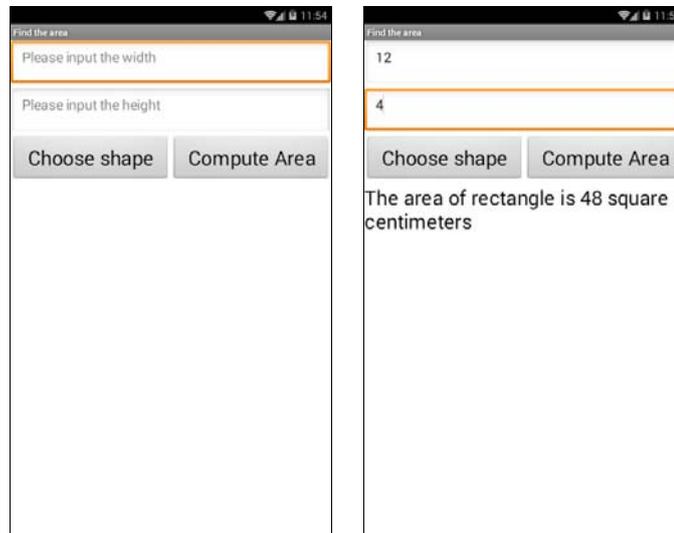
- (1) Start/Initial screen: when the app is just started, the “**Compute Area**” button is shown but can not be clicked. Click the “**Choose shape**” **ListPicker** component will show the three kinds of shapes.



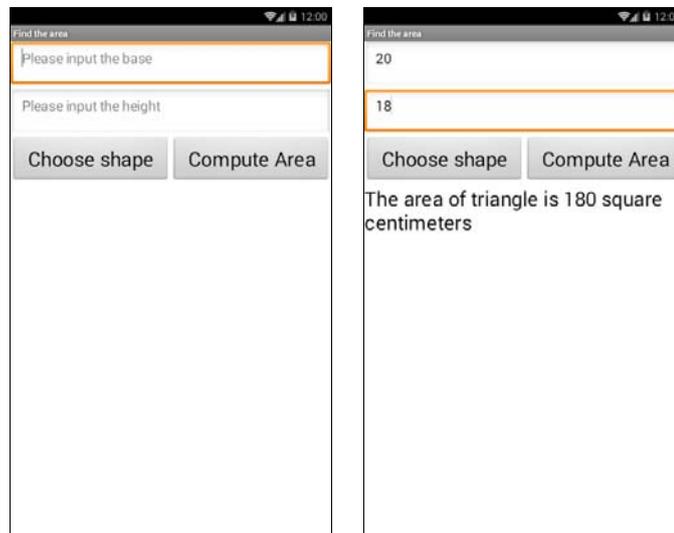
- (2) The layout after the user has chosen “**circle**”. Input the radius and press the “**Compute Area**” button, the correct result will be shown on the **Label**.



- (3) The layout after the user has chosen “**rectangle**”. Input the width, the height and press the “**Compute Area**” button, the correct result will be shown on the **Label**.



- (4) The layout after the user has chosen “**triangle**”. Input the base and the height and press the “**Compute Area**” button, the correct result will be shown on the **Label**.



D. Test your app:

- (1) If the option “**circle**” is chosen, then the app should show one **TextBox** component to input the radius with its Hint property set correctly. Press the “**Compute Area**” button and show the correct result.
- (2) If the option “**rectangle**” is chosen, then the app should show two **TextBox** components to input the width and the height with its Hint property set correctly. Press the “**Compute Area**” button and show the correct result.

- (3) If the option “**triangle**” is chosen, then the app should show two **TextBox** components to input the base and the height with its Hint property set correctly. Press the “**Compute Area**” button and show the correct result.

E. Assessment Criteria :

Criteria	Points	Score
(1) Click the “ Choose shape ” ListPicker component will show the three kinds of shape to computer the area.	6	
(2) If the option “ circle ” is chosen, then the app should show one TextBox component to input the radius.	4	
(3) Show the correct circle area result according to the input.	4	
(4) If the option “ rectangle ” is chosen, then the app should show two TextBox components to input the width and the height with its Hint property set correctly.	4	
(5) Show the correct rectangle area result according to the input.	4	
(6) If the option “ triangle ” is chosen, then the app should show two TextBox components to input the base and the height with its Hint property set correctly.	4	
(7) Show the correct triangle area result according to the input.	4	
Total Score	30	