

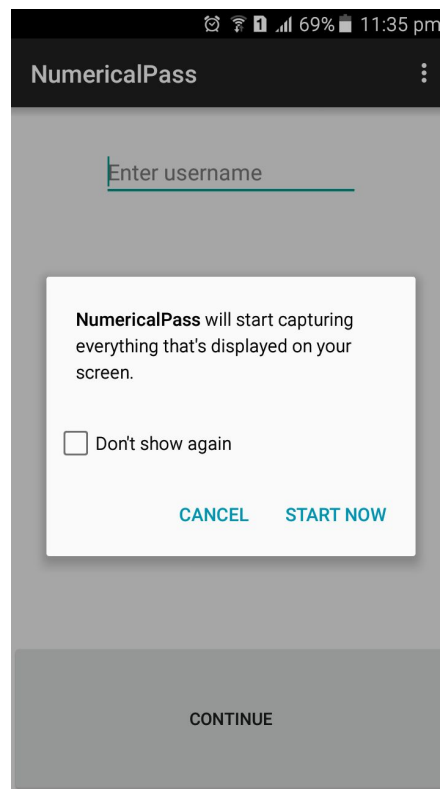
Dynamic Password Application-Numerical

Overview

The numerical password application allows user to select a password based on mathematical expressions. The user needs to remember a chosen expression to successfully login.

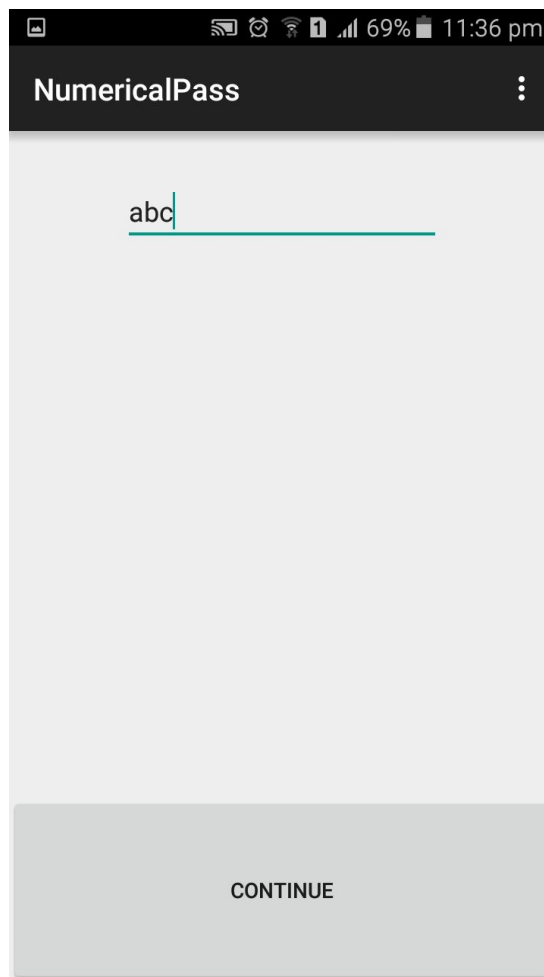
Registration Phase

1. When you open the Numerical Password Application, you will encounter the following pop up



Select **start now**. If you select cancel you will not be able to use the application further.

2. Next, enter any username, preferably your name and continue.



The screenshot shows a mobile application interface for 'NumericalPass'. At the top, there is a status bar with various icons and the time '11:36 pm'. Below the status bar is a dark header with the app name 'NumericalPass' and a menu icon. The main area is a light gray rectangle containing a text input field with the text 'abc' and a green cursor. At the bottom of the screen is a gray button labeled 'CONTINUE'.

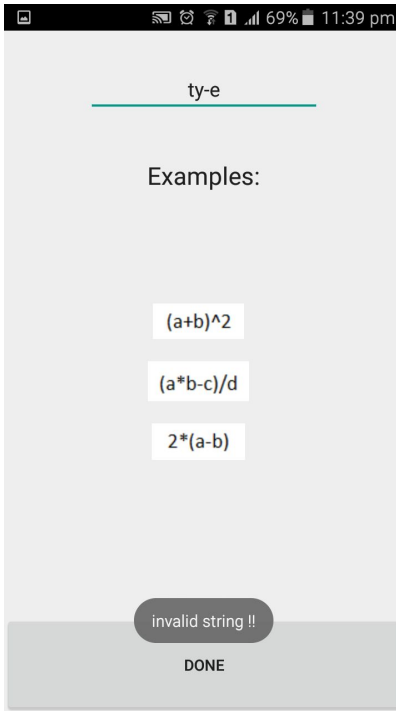
3. Next, you need to enter a formula in the given text field (this you need to remember at the time of login). Below are some examples of the formulas which you can use or refer.

4. Make sure the formula is easy to calculate (because this is your password and you need to login everytime using this) but difficult for malicious shoulder surfer to judge by looking at just the variables and it's values.

The screenshot shows a mobile application interface. At the top, there is a status bar with icons for signal, Wi-Fi, battery, and the time 11:36 pm. Below the status bar, a text input field contains the formula $x+y+z$. Underneath the input field, the word "Examples:" is displayed. Below this, three example formulas are shown in separate white boxes: $(a+b)^2$, $(a*b-c)/d$, and $2*(a-b)$. At the bottom of the screen, there is a grey button labeled "DONE".

5. Any two variables should be separated by an operator. You may use brackets to make the formula easy to understand.

6. In case the formula is invalid by the system, a toast will say that your formula is invalid. In that case you must use another formula.



7. After entering the formula, you need to verify the formula by entering the correct answer corresponding to the values given beside the variables.

The screenshot shows a mobile application interface. At the top, a status bar displays icons for signal, Wi-Fi, battery (69%), and time (11:40 pm). Below this, the text "Formula: x+y+z" is centered. A large text area contains the instructions: "Round off till 2 decimal digits or enter only the integer value", "Value of pi: 3.14", and "Substitute these values in the above formula:". Below the text area, the values "x=2", "y=8", and "z=8" are listed. A vertical cursor is visible in the text area. At the bottom, there are two buttons: "CHECK" and "CONFIRM".

Formula: $x+y+z$

Round off till 2 decimal digits or
enter only the integer value
Value of pi: 3.14
Substitute these values in the above
formula:

x=2
y=8
z=8

CHECK

CONFIRM

8. Once you enter the correct answer, the correct formula you selected is displayed.

Formula: $x+y+z$

enter only the integer value

Value of pi: 3.14

Substitute these values in the above formula:

$x=2$
 $y=8$
 $z=8$

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YOU ARE RIGHT
You are right

CONFIRM

Your formula: $x+y+z$

confirm

9. In case you are wrong, you may try re-entering the correct answer.

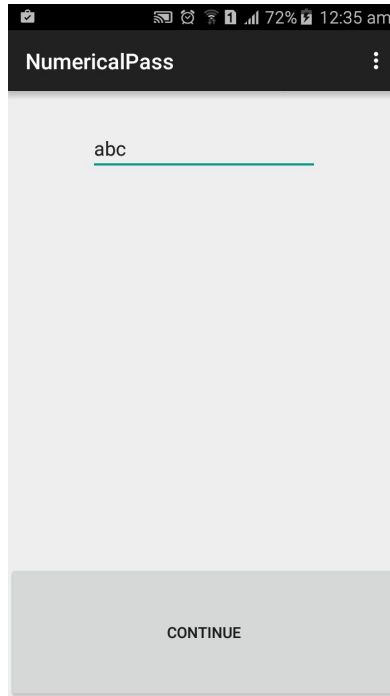
The screenshot shows a mobile application interface. At the top, a status bar displays icons for signal, Wi-Fi, battery (69%), and time (11:40 pm). Below the status bar, the text "Formula: $x+y+z$ " is centered. A faint, semi-transparent text "Enter only the integer value" is visible in the background. Below this, the text "Value of pi: 3.14" is displayed. The instruction "Substitute these values in the above formula:" follows. Then, the values "x=2", "y=8", and "z=8" are listed. A text input field contains the number "2". At the bottom, there are two buttons: a grey button labeled "CHECK" with the text "Let's try again!!" below it, and a white button labeled "CONFIRM" below that.

9. Next, you need to login using the password you just verified. Please make sure you don't copy or write the password. The main goal of the user study is to see if the user is able to remember the password.

Login Phase I

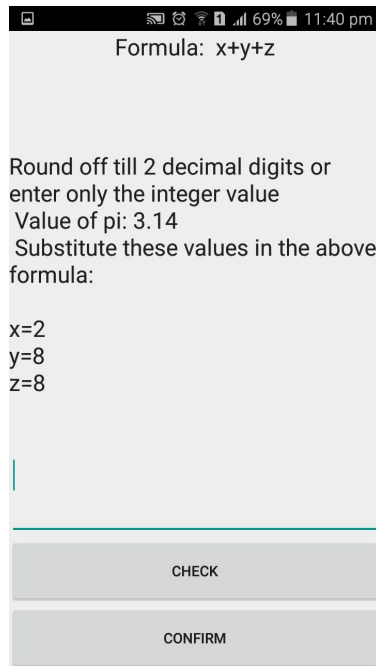
You need to login the same day you register and verify the password.

1. Enter the username you entered at the time of sign up (registration). Press continue.



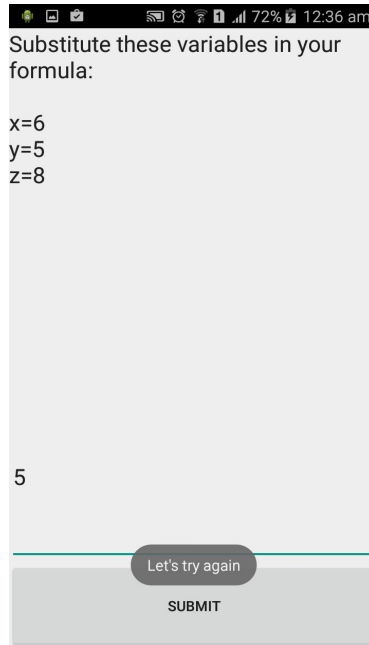
A screenshot of a mobile application interface for 'NumericalPass'. The status bar at the top shows the time as 12:35 am and battery at 72%. The app title 'NumericalPass' is in the top header. Below the header is a text input field containing the text 'abc'. At the bottom of the screen is a large grey button labeled 'CONTINUE'.

2. Next, remembering your formula, enter the correct answer by calculating the values corresponding to the variables in your formula.



A screenshot of a mobile application interface for 'NumericalPass'. The status bar at the top shows the time as 11:40 pm and battery at 69%. The app title 'NumericalPass' is in the top header. Below the header, the text 'Formula: $x+y+z$ ' is displayed. Below this, instructions are shown: 'Round off till 2 decimal digits or enter only the integer value', 'Value of pi: 3.14', and 'Substitute these values in the above formula:'. Below the instructions, the values 'x=2', 'y=8', and 'z=8' are listed. At the bottom of the screen are two large grey buttons labeled 'CHECK' and 'CONFIRM'.

3. If your answer is correct, this means you are able to login successfully.
4. In case your answer is wrong, you will be given 4 attempts in total, in case you fail you will need to repeat the complete login procedure.




The screenshot shows a mobile application interface. At the top, there is a status bar with icons for signal, Wi-Fi, battery (72%), and time (12:36 am). Below the status bar, the text "Substitute these variables in your formula:" is displayed. Underneath this text, the following variables are listed:
 $x=6$
 $y=5$
 $z=8$
Below these variables, the number "5" is displayed. At the bottom of the screen, there is a horizontal line. Below the line, there is a button labeled "Let's try again" and a button labeled "SUBMIT".

5. If you have forgotten your password you need to sign up again with a new user name.


6. Once you get your password right a feedback will appear. Please enter your feedback and press the submit button to complete the login procedure.

Feedback Form


How easy is to remember the password

Hard  Easy


Ease of registration

Hard  Easy

Ease of login

Hard  Easy


How intuitive is the password scheme

Not so intuitive  Very intuitive

Any other suggestion

Write your thoughts

Overall rating

Low  High

SUBMIT

7. If you forget your password in Login Phase II, your complete login process will be considered as a failed event and you'll have to start from registration again.
8. Next, you need to login after a time period of 1 week. You must not try to login or perform any activity on the application anytime before 1 week. Else, your user study will be considered as a failed user study and you will not receive any incentive.

Login Phase II

Next, you need to login after a retention period of 1 week. This is to check if you still remember your password or not.

Repeat the same process as in Login Phase I.

Feedback- You can shake your phone to give feedback and also include screenshot of any particulars of the screen you are facing problem.