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# GUIDE TO THE GETPASS PACKAGE

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# 1 Introduction

`getPass` [5] is an R package for reading user input in R with masking. There is one exported function, `getPass()`, which will behave as R's `readline()` but with masked input. You can pass a message to the password input via the `msg` argument, similar to the `prompt` argument in `readline()`.

## 1.1 Installation

You can install the stable version from CRAN using the usual `install.packages()`:

```
1 install.packages("getPass")
```

The development version is maintained on GitHub. You can install this version using any of the well-known installer packages available to R:

```
1 ### Pick your preference
2 devtools::install_github("wrathematics/getPass")
3 ghit::install_github("wrathematics/getPass")
4 remotes::install_github("wrathematics/getPass")
```

## 2 Password Reading

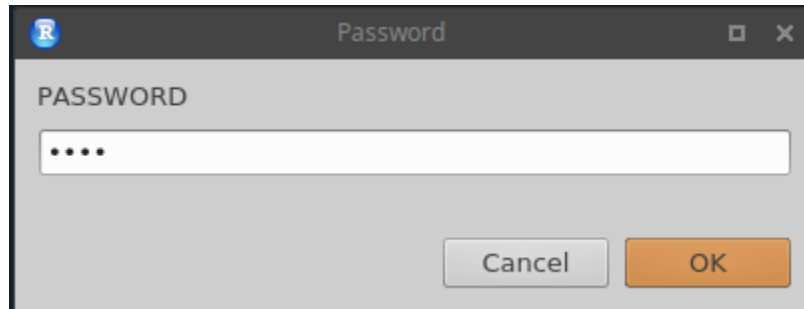
Using the package should mostly amount to calling `getPass::getPass()`. Currently there are two arguments to `getPass()`. By setting the `msg` parameter, you can change what is printed in the password dialogue box:

```
1 getPass()
2 ## PASSWORD: ****
3 ## [1] "asdf"
4
5 getPass(msg="")
6 ## ****
7 ## [1] "asdf"
8
9 getPass(msg="shh, it's a secret! ")
10 ## shh, it's a secret! ****
11 ## [1] "asdf"
```

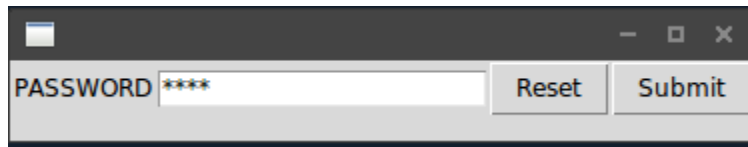
Finally, there is the `forcemask` flag, which indicates if reading without masking should be possible. By default, if one is running under an environment that does not allow reading with masking, then a warning message will be printed, and R's ordinary `readline()` will be used. However, if this flag is set to `TRUE`, then the function will stop with an error.

## 2.1 Interfaces

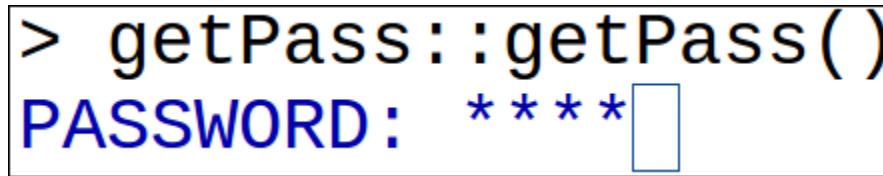
The form that password input takes will vary based on how you interface to R (with implementation details below). If you use **RStudio**, it will look something like this:



If you use **RGui** on Windows or **R.app** (if **tcltk** is supported; see Section 4 below), it will look like:



Finally, if you use the terminal (any OS), it will look like:



We believe this covers pretty much everyone. One notable exclusion is emacs in an environment without **tcltk**. Due to how it handles buffers, I believe it *can't* be supported. If that is incorrect, please let us know!

## 3 Password Hashing

### 3.1 The Short Version

After reading in a password that you intend to store (or in some way “pass around”), always hash it using a cryptographic hashing function. Some options for hashing with R include:

- **argon2** <https://cran.r-project.org/package=argon2> [4]
- **sodium** <https://cran.r-project.org/package=sodium> [3]
- **bcrypt** <https://cran.r-project.org/package=bcrypt> [1]
- **openssl** <https://cran.r-project.org/package=openssl> [2]

### 3.2 The Long(er) Version

In an effort to keep the package as minimal as possible, we do not include any methods for hashing passwords. However, the suggested package **argon2** [4] contains an implementation of the *argon2()* secure password hashing function. Many experts (of which I am not one) have written at length about

this topic; and it can quickly get kind of complicated and mathy. The basic idea is: don't store passwords as plaintext. We can use a secure hash function to hash the password, basically turning the input string into a new "garbled" string. Hash functions are hard to "invert", so you can know which hash function I used and know the output, and still (hopefully) not recover the original string.

We can quickly handle this problem without having to think very hard. Say you used `getPass` to read a password into the variable `pass`:

```
1 pass
2 ## [1] "myPassw0rd!"
```

An excellent choice to be sure. This is the "plaintext". We can hash it with a call to the `argon2` packages's `pw_hash()` function:

```
1 hash <- argon2::pw_hash(pass)
2 hash
3 ## [1] "$argon2i$v=19$m=8192,t=16,p=2$JeV26p9Zmn1FyHKUWCe/46
   E3q2dtaXzuH06L4Qg15IEgkNr0awOI5TnxI+6yLFRmLUZG6R4GJK0BTakZhKgItg$
   MdafxeYEstYyT3RWyj2DDDCBAhfi8dE30tn6L1/
   Xaaus5su5Xiq2fdnD2zCK39DXTUyGws0TTTTZzGxKw104mtg"
4 attr(,"hashtype")
5 [1] "argon2"
```

Now say you need to validate a password that's been entered against the hashed password. All you need to do is call `pw_check()`:

```
1 argon2::pw_check(hash, pass)
2 ## [1] TRUE
3 argon2::pw_check(hash, "password")
4 ## [1] FALSE
5 argon2::pw_check(hash, "1234")
6 ## [1] FALSE
```

So inside of a user-facing application, the process might look something like this:

```
1 user_pw <- getPass::getPass()
2 hash_pw <- argon2::pw_hash(user_pw)
3 store_user_pw(hash_pw) # pseudocode, but you get the idea
```

There are good reasons to prefer `argon2`: it is lightweight (with no package or system dependencies) and it is believed to be very secure. However, there are other options available in R, including the `bcrypt`, `sodium`, and `openssl` packages.

## 4 Implementation Details

### 4.1 RStudio

To use this with RStudio, you need:

- RStudio desktop version  $\geq 0.99.879$ .
- The `rstudioapi` package version  $\geq 0.5$ .

In this case, the `getPass()` function wraps the `rstudioapi` function `askForPassword()`.

## 4.2 Command Line

Here, the input reader is custom C code. It has been tested successfully on Windows (in the “RTerm” session), Mac (in the terminal, not R.app which will not work!), Linux, and FreeBSD. The maximum length for a password in this case is 255 characters.

On Windows, the reader is just `_getch()`. On 'nix environments (Mac, Linux, ...), masking is made possible via `tcsetattr()`. Special handling for each is provided for handling `ctrl+c` and `backspace`.

If you discover a problem using this, please [file an issue report](#).

## 4.3 RGui (Windows)

If you use RGui (the Windows R GUI), then this should use the `tcltk` package. I don't think it's actually possible for `tcltk` to be unavailable on Windows, so if you are an RGui user and have trouble with this, please [file an issue report](#).

## 4.4 R.app (Mac)

You will need to install dependencies for the `tcltk` package. I'm not completely sure what this process involves for Macs; if you know, please let us know. If `tcltk` is unavailable, then it will use the “unsupported” method below.

## 4.5 Other/Unsupported Platforms

When a platform is unsupported, the function will optionally default to use R's `readline()` (without masking!) with a warning communicated to the user, or it can stop with an error.

# 5 Acknowledgements

We thank Kevin Ushey for his assistance in answering questions in regard to supporting RStudio.

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# References

- [1] Jeroen Ooms. *bcrypt: 'Blowfish' Password Hashing Algorithm*, 2015. R package version 0.2.
- [2] Jeroen Ooms. *openssl: Toolkit for Encryption, Signatures and Certificates Based on OpenSSL*, 2016. R package version 0.9.6.

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  - [5] Drew Schmidt and Wei-Chen Chen. *getPass: Masked user input*, 2017. R package version 0.2-1.