

## Regular expressions survey

Thank you for offering to take part in the regular expressions survey.

It may look long, but don't be daunted - most of the questions are multiple choice, and it should take less than 10 minutes to complete. All responses are anonymous unless you choose to provide an e-mail address (optional).

Please try to answer the questions honestly, without looking up any information online - it is a survey, not an assessment. Your experiences and opinions are what count.

Required questions are marked with a \*. All other questions are optional.

Before continuing, please ensure you have read the project page, which provides details of how your data will be used and your rights as a participant:

(project page link)

### Consent

*I have read the project page above. I understand that participation in this survey is optional and I am free to withdraw at any time. I understand that the information I give may be used anonymously in published research. I agree to take part in the survey.*

**Answer:** one of 'yes' or 'no'

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## Definitions

### Regular expression

For the purpose of this survey, a **regular expression** (aka 'regex') is defined as a sequence of characters that define a search pattern to match against some other piece of text. They comprise literal characters and metacharacters with special meanings.

For example, the regular expression `/cows? moo+/?` matches both the input strings `cow moo` and `cows mooooooo`.

Simpler 'wildcards' as used in shell globs (e.g. `ls *.java` etc.) are *not* considered regular expressions.

### Production code

For the purpose of this survey, **production code** is defined as code that you work on as part of your job, is intended to be used by more than one person and would normally be stored in a version control system, e.g. GitHub or Subversion.

## **In what contexts do you use regular expressions?**

**Answer:** *one or more from following list, or custom value:*

- Production code (as defined above)
- Command-line tools or scripts for personal use
- Text editors or IDEs
- Interactive data analysis tools
- Other (please state)

## **When was the last time you created or modified a regular expression in production code?**

See above for definition of production code.

**Answer:** *one from following list:*

- In the last week
- In the last month
- In the last year
- Over a year ago
- Never

## **When you create or modify a regular expression in production code, is the code reviewed by someone else?**

**Answer:** *one from following list:*

- Never
- Rarely
- Occasionally
- Frequently
- Always

## **When was the last time you modified a regular expression in production code originally created by someone else?**

**Answer:** *one from following list:*

- In the last week
  - In the last month
  - In the last year
  - Over a year ago
  - Never
-

## Your opinions about regular expressions

Please rate how much you agree or disagree with the following statements using the scale below:

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

**Regular expressions are valuable to me in my job**

**In general, regular expressions are more readable than other code**

**In general, regular expressions are less error-prone than other code**

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## Regular expression features you use

Which regular expression features have you used in the past? Please tick all that apply.

**Repetition, e.g. + or \***

**Matching start or end of line, e.g. ^ or \$**

**Capture groups, e.g. (caught)**

**Word boundaries, e.g. \b**

**Lazy repetition, e.g. z+?**

**Lookahead or lookbehind assertions, e.g. (?<=a)bc**

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## Deciding when to use regular expressions

**The last time you added a regex to code, what was the main reason for this decision?**

**Answer:** *one or more from following list, or custom value:*

- Regex solution was more concise/more readable than alternative approaches
- Regex solution was quicker or easier to implement than alternative approaches
- For consistency with existing code or library/framework conventions
- Reused an existing regex-based solution found online or from other codebase
- Following style guides or team practices
- I enjoy using regular expressions
- Did not consider any alternatives
- Don't know
- Other (please state)

**Imagine a simple string validation problem that could be solved either using a regex or other built-in language/platform features. In general, which would you prefer?**

**Answer:** *one from following list:*

- I would prefer to use a regular expression
- I would prefer to use other built-in language/platform features
- No preference/it depends

**Please can you explain the reason for your previous answer?**

Also, what factors might cause you to change your answer?

**Answer:** *free text (single line)*

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## Testing and validating regular expressions

**When you create or modify regular expressions, how often do you use a tool to help you?**

**Answer:** *one from following list:*

- Never
- Rarely
- Occasionally

- Frequently
- Always

### **Do you prefer any tool in particular?**

If you use more than one tool, pick the one you use most often.

**Answer:** *one from following list, or custom value:*

- debuggex
- regex101
- regexpal
- regexr
- RegxBuddy
- regextester
- Other (please state)
- I search for "regex tester/debugger" or similar and pick an arbitrary tool
- Not applicable

### **When you write production code, how often do you include automated tests to check it behaves as intended?**

Examples of automated tests include unit tests, integration tests or acceptance tests. It also counts if someone other than you implements these tests.

**Answer:** *one from following list:*

- Never
- Rarely
- Occasionally
- Frequently
- Always

### **When you write production code that uses regular expressions, how often do you include automated tests to check they behave as intended?**

**Answer:** *one from following list:*

- Never
- Rarely
- Occasionally
- Frequently
- Always

**If your approach to testing regular expressions differs from other code, can you explain why?**

*Answer: free text (single line)*

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## **Risks of using regular expressions**

**How often do you consider performance when writing or reviewing a regex?**

*Answer: one from following list:*

- Never
- Rarely
- Occasionally
- Frequently
- Always

**Are you aware that some regular expressions' execution time increases disproportionately as the input gets longer?**

In some cases, adding a single character to the input string being matched can double the time a regular expression takes to execute.

Were you already aware of this?

*Answer: one from following list:*

- Yes
- No
- Not sure

**Are you aware of the concept of a Regular Expression Denial of Service attack (ReDoS)?**

For example, if a 'slow' regular expression of the type described above is running on a server and matching against user input, an attacker could send a single malicious request that seriously slows down the server or even causes it to hang indefinitely. This is also known as 'catastrophic backtracking'.

Were you already aware of this?

*Answer: one from following list:*

- Yes
- No
- Not sure

## Prevention and reduction of risks

### Do you currently have any processes for avoiding regular expression performance problems or vulnerabilities?

For example, you may look out for anti-patterns in regular expressions or use analysis tools. If you do, please explain below.

**Answer:** *free text (multi-line)*

### Which of the following do you think would be most helpful to combat ReDoS?

**Answer:** *one from following list:*

- Automatic detection of vulnerable regexes during Continuous Integration (CI)
- Online debugging tools to test regexes for vulnerabilities
- Tutorials and other training materials on how to avoid regex vulnerabilities
- It is not important
- Not sure
- Other (please state)

## Regular expression knowledge in your team

### How would you rate your own current knowledge of regular expressions?

**Answer:** *one from following list:*

- 1 (Beginner)
- 2
- 3
- 4
- 5
- 6 (Expert)

### Is there a person in your team who is considered a trusted source of knowledge about regular expressions?

**Answer:** *one from following list:*

- Yes (it is me)
- Yes (it is someone else)
- No
- Not sure

## **Where did you gain most of your knowledge of regular expressions?**

**Answer:** *one from following list:*

- Self-directed study (e.g. a website or book that explains regexes)
- School (primary/secondary education)
- University/college (higher education)
- Training provided by an employer
- While carrying out my job/a previous job
- Coding bootcamp or similar
- Not sure
- Other (please state)

## **Did you have knowledge of regular expressions prior to your first job in software development?**

**Answer:** *one from following list:*

- Yes
- No
- Not sure

## **Your views about regular expression knowledge**

Please rate how much you agree or disagree with the following statements using the scale below:

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

**Regular expressions are an important part of software development knowledge**

**I found regular expressions daunting when I was learning to code**

**Great software developers make use of regular expressions**

**I am always confident in my use of regular expressions**

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## Comparison with other areas of knowledge

### How would you rate your own knowledge of the version control system used by your team, if any (e.g. Git or Subversion)?

If you use more than one version control system, answer thinking about the one you know the best.

**Answer:** *one from following list:*

- 1 (Beginner)
- 2
- 3
- 4
- 5
- 6 (Expert)

### Is there a person in your team who is considered a trusted source of knowledge about the version control system you use (e.g. Git or Subversion)?

**Answer:** *one from following list:*

- Yes (it is me)
- Yes (it is someone else)
- No
- Not sure
- We don't use a version control system

### How would you rate your own knowledge of any data query languages used by your team (e.g. SQL, XQuery or GraphQL)?

If you use more than one data query language, answer thinking about the one you know the best.

**Answer:** *one from following list:*

- 1 (Beginner)
- 2
- 3
- 4
- 5
- 6 (Expert)

### Is there a person in your team who is considered a trusted source of knowledge about the data query language(s) you use (e.g. SQL, XQuery or GraphQL)?

**Answer:** *one from following list:*

- Yes (it is me)

- Yes (it is someone else)
  - No
  - Not sure
  - We don't use data query languages
- 

## About you

### How many years' professional experience do you have in a development role?

This includes both your current employment and any previous jobs.

**Answer:** *one from following list:*

- Less than one year
- 1-2 years
- 3-5 years
- 6-10 years
- more than 10 years

### Which programming language(s) that support regular expressions do you have the most experience with?

Please list up to three languages separated by commas.

**Answer:** *free text (single line)*

### What is your current role?

Please choose an option from the list below that best describes your role.

**Answer:** *one from following list:*

- Front-end developer
- Back-end developer
- Full-stack developer
- Systems administrator
- Mobile developer
- Network engineer
- DevOps
- Architect
- Team lead
- Tester
- Engineering manager
- Prefer not to say
- Other (please state)

## Do you have an academic degree in a computing-related subject?

**Answer:** *one from following list:*

- No
  - Yes
  - Prefer not to say
- 

## Other

### Do you have any more comments or feedback about these topics or the survey itself?

**Answer:** *free text (multi-line)*

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## Contact details (optional)

Are you willing to discuss your answers and answer some follow-up questions via an interview lasting 45 minutes at a convenient time? If so, please provide an e-mail address below and tick the consent checkbox.

Under no circumstances will your e-mail address be used for any other reasons or shared with third parties. Please read the project page (linked at the top of the survey) for more information.

### Your e-mail address

**Answer:** *free text (single line)*

### Consent to be contacted

I consent to my e-mail address being used to contact me to discuss my answers and ask further questions relating to this project (please tick the box if you agree).

**Answer:** *checkbox (default: unchecked)*

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