

Skills for Code Review - Pilot

Dear developer,

Welcome to the study about skills for code review! The following survey will help us better understand what skills are needed for code reviews and how can developers improve in their code review practice. Therefore, we are looking for respondents who are developers currently doing code reviews.

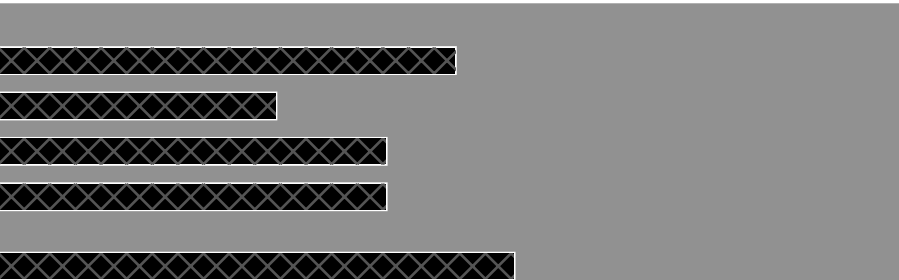
In this questionnaire we ask:

- about what skills do you use in code reviews
- how proficient are you with these skills
- what skills are crucial
- what skills you would like to improve
- for general information about you as a developer

Further information about the survey:

- The questionnaire takes 10-15 minutes.
- Your answers are fully anonymized.
- The anonymized responses will be used to produce an academic publication and will be shared in a publically available dataset.
- Your participation is voluntary. You can withdraw from the survey at any point in time without any consequences.
- This study is approved by the ethical committee

Thank you for your help!



There are 22 questions in this survey.

Consent with participation

Hereby we would like to ask you to provide us with your consent to be included in the study and to answer the initial qualification questions.

By answering “yes” to the question below you confirm that:

- you are 18 years old or older
- you have read and understood the conditions of the study
- you provide an explicit consent to participate in the study

*

Choose one of the following answers
Please choose **only one** of the following:

- Yes
- No

Which of these websites do you most frequently use as an aid when programming? *

Choose one of the following answers
Please choose **only one** of the following:

- Wikipedia
- LinkedIn
- Stack Overflow
- MemoryAlpha
- I have not used any of the websites for programming

Which of these values would be the most fitting for a Boolean? *

Choose one of the following answers
Please choose **only one** of the following:

- Small
- Solid
- Quadratic
- Red
- True
- I don't know

Choose the answer that best fits the definition of a recursive function. *

Choose one of the following answers

Please choose **only one** of the following:

- A function that runs for an infinite time
- A function that does not have a return value
- A function that can be called from other functions
- A function that calls itself
- A function that does not require any inputs
- I don't know

Usage of skills

In the first part of the survey, we need to understand what skills do you actually **use** in code reviews. Please answer the questions as they relate to your own experience when doing code reviews.

Below, you find a list of skills that are relevant in the code review context. They can be needed by the reviewer, but also the code author or they can be needed in both roles.

Please, rate how often do you need each of these technical skills to do an efficient code review:

Please choose the appropriate response for each item:

| | Never | Rarely | Sometimes | Often | Always |
|--|-------|--------|-----------|-------|--------|
| To write a clear change description <i>(As a code author)</i> Explaining what is the goal and behavior of the change, linking to issue management systems (if it is a bug fix) etc. | | | | | |
| To develop a mental model of the change Developing a mental model of the change and how it relates to the requirements and application domain. | | | | | |
| To systematically navigate the codebase Systematically exploring the codebase, applying correctly knowledge of the functions and libraries used in the system. | | | | | |
| To find relevant information beyond the codebase in the documentation, requirements, language documentation, online resources, literature etc. | | | | | |
| To identify patterns in the code Identifying patterns in the code and its structural properties, evaluating design patterns implementation, identifying what parts of the code are or can be reused. | | | | | |
| To proficiently use the tools used in the team Code review tools, IDEs, versioning software, issue management systems, etc. | | | | | |
| To evaluate if the implementation fulfills the requirements To evaluate architectural implications of the change To evaluate the code change quality with respect to its effects on the correctness of the software system | | | | | |
| To evaluate the code change quality with respect to its effects on the user-affecting properties of the software system Usability, performance, security. | | | | | |
| To evaluate the code change quality with respect to its effects on the evolvability of the software system Structuredness, maintainability, compatibility, etc. | | | | | |
| To estimate the complexity of the problem and solution Distinguishing complex and simple problems, estimating relevant complexity measures. | | | | | |

| | Never | Rarely | Sometimes | Often | Always |
|---|-------|--------|-----------|-------|--------|
| To know and correctly use programming languages | | | | | |
| Effectively using programming languages applied in the system with respect to the related programming paradigms (object-oriented programming, functional, procedural programming, etc.) | | | | | |

Please, rate how often do you need each of these social skills to do an efficient code review:

Please choose the appropriate response for each item:

| | Never | Rarely | Sometimes | Often | Always |
|---|-------|--------|-----------|-------|--------|
| To communicate in an understandable way | | | | | |
| To give constructive feedback | | | | | |
| Willing to criticize constructively, asking important and relevant questions, suggesting adjustments and alternative solutions, helping others realize new ideas. | | | | | |
| To understand the dynamics of the discussion and its conclusions | | | | | |
| Being able to follow how a discussion is developing over time, how the participants react to each other, and what conclusions can be taken out of the discussion. | | | | | |
| To adjust communication style to different individuals | | | | | |
| To pick up and act on ideas of others | | | | | |
| To be willing to compromise | | | | | |
| To convince others about your ideas | | | | | |
| To mentor other developers | | | | | |
| Guiding less experienced developers to develop their code reviewing and programming skills and their understanding of the team/project/company processes. | | | | | |
| To effectively manage own emotions | | | | | |
| Dealing with negative emotions and distressing circumstances, accepting negative feedback, dealing with external stress. | | | | | |
| To handle conflicts | | | | | |
| Enhancing productive outcomes of a conflict while minimizing its escalation or harm done. | | | | | |
| To be aware of the capacity of co-workers in terms of time, experience and knowledge | | | | | |

Please, rate how often do you need each of these personal skills to do an efficient code review:

Please choose the appropriate response for each item:

| | Never | Rarely | Sometimes | Often | Always |
|---|-------|--------|-----------|-------|--------|
| To have effective review time-management | | | | | |
| Assigning appropriate time resources for the reviews, balance review response time with other responsibilities. | | | | | |
| To set, express, and manage priorities | | | | | |
| related to software requirements, release planning, bug severity, product backlog in agile development etc. | | | | | |
| To understand the purpose of the code review and the level of detail needed for it | | | | | |
| To be willing to learn and improve | | | | | |
| Being open to new ideas, able to learn from past mistakes for future reviews. | | | | | |

Level of your skills

We would like to ask you to go through the list of skills once again. Now, we are interested in which areas you are **more or less skilled** at.

Please, rate what level of these technical skills do you have when used in code review:

Please choose the appropriate response for each item:

| | Poor | Fair | Good | Very Good | Excellent |
|---|------|------|------|-----------|-----------|
| To write a clear change description | | | | | |
| <i>(As a code author)</i> | | | | | |
| Explaining what is the goal and behavior of the change, linking to issue management systems (if it is a bug fix) etc. | | | | | |
| To develop a mental model of the change | | | | | |
| Developing a mental model of the change and how it relates to the requirements and application domain. | | | | | |
| To systematically navigate the codebase | | | | | |
| Systematically exploring the codebase, applying correctly in the review the knowledge of the functions and libraries used in the system. | | | | | |
| To find relevant information beyond the codebase | | | | | |
| in the documentation, requirements, language documentation, online resources, literature etc. | | | | | |
| To identify patterns in the code | | | | | |
| Identifying patterns in the code and its structural properties, evaluating design patterns implementation, identifying what parts of the code are or can be reused. | | | | | |
| To proficiently use the tools used in the team | | | | | |
| Code review tools, IDEs, versioning software, issue management systems, etc. | | | | | |
| To evaluate if the implementation fulfills the requirements | | | | | |
| To evaluate architectural implications of the change | | | | | |
| To evaluate the code change quality with respect to its effects on the correctness of the software system | | | | | |
| To evaluate the code change quality with respect to its effects on the user-affecting properties of the software system | | | | | |
| Usability, performance, security. | | | | | |
| To evaluate the code change quality with respect to its effects on the evolvability of the software system | | | | | |
| Structuredness, maintainability, compatibility, etc. | | | | | |
| To estimate the complexity of the problem and solution | | | | | |
| Distinguishing complex and simple problems, estimating relevant complexity measures. | | | | | |
| To know and correctly use programming languages | | | | | |
| Effectively using programming languages applied in the system with respect to the related programming paradigms (object-oriented programming, functional, procedural programming, etc.) | | | | | |

Please, rate what level of these social skills do you have when used in code review:

Please choose the appropriate response for each item:

| | Poor | Fair | Good | Very Good | Excellent |
|---|------|------|------|-----------|-----------|
| To communicate in an understandable way | | | | | |
| To give constructive feedback | | | | | |
| Willing to criticize constructively, asking important and relevant questions, suggesting adjustments and alternative solutions, helping others realize new ideas. | | | | | |

- To proficiently use the tools used in the team
- To evaluate if the implementation fulfills the requirements
- To evaluate architectural implications of the change
- To evaluate the code change quality with respect to its effects on the correctness of the software system
- To evaluate the code change quality with respect to its effects on the user-affecting properties of the software system
- To evaluate the code change quality with respect to its effects on the evolvability of the software system
- To estimate complexity of the problem and solution
- To know and correctly use programming languages
- To communicate in an understandable way
- To give constructive feedback
- To understand the dynamics of the discussion and its conclusions
- To adjust communication style to different individuals
- To pick up and act on ideas of others
- To be willing to compromise
- To convince others about your ideas
- To mentor other developers
- To effectively manage own emotions
- To handle conflicts
- To be aware of the capacity of co-workers in terms of time, experience and knowledge
- To have effective review time-management
- To set, express, and manage priorities
- To understand the purpose of the code review and the level of detail needed for it
- To be willing to learn and improve

Please select and rank 5 skills you find the most important for an efficient code review.

Please number each box in order of preference from 1 to 28

- To write a clear change description

-
- To develop a mental model of the change
-
- To systematically navigate codebase
-
- To find relevant information beyond the codebase
-
- To identify patterns in the code
-
- To proficiently use the tools used in the team
-
- To evaluate if the implementation fulfills the requirements
-
- To evaluate architectural implications of the change
-
- To evaluate the code change quality with respect to its effects on the correctness of the software system
-
- To evaluate the code change quality with respect to its effects on the user-affecting properties of the software system
-
- To evaluate the code change quality with respect to its effects on the evolvability of the software system
-
- To estimate complexity of the problem and solution
-
- To know and correctly use programming languages
-
- To communicate in an understandable way
-
- To give constructive feedback
-
- To understand the dynamics of the discussion and its conclusions
-
- To adjust communication style to different individuals
-
- To pick up and act on ideas of others
-
- To be willing to compromise
-
- To convince others about your ideas
-
- To mentor other developers
-
- To effectively manage own emotions
-
- To handle conflicts
-
- To be aware of the capacity of co-workers in terms of time, experience and knowledge
-
- To have effective review time-management
-
- To set, express, and manage priorities
-

- To understand the purpose of the code review and the level of detail needed for it

To be willing to learn and improve

About you

We would like to know more about you to find out if different developers use a different skill set or need to develop in different areas.

What is your gender?

Please choose **only one** of the following:

- Man
- Woman
- Non-binary
- Prefer not to disclose
- Other

What is your age?

Please write your answer here:

What is your highest achieved level of education?

Please choose **only one** of the following:

- High School but did not graduate
- High School Graduate or GED
- Some college or 2-year degree
- Bachelor in CS (Computer Science)
- Bachelor in STEM (Science, Technology, Engineering and Mathematics)
- Bachelor in a different area than CS or STEM
- Master in CS
- Master in STEM
- Master in a different area than CS or STEM
- PhD or higher academic title in CS
- PhD or higher academic title in STEM
- PhD or higher academic title in a different area than CS or STEM

What is your main role?

Please choose **only one** of the following:

- Programmer / Software Developer
- Tester
- Analyst
- Software Architect
- IT Operations
- Manager
- Researcher / Professor
- PhD Student
- Student
- Other

How many years have you been developing software professionally?

Please choose **only one** of the following:

- I have no experience in professional software development
- 1 year or less
- 2 years
- 3 - 5 years
- 6 - 10 years
- 11 years or more

How often do you currently program software?

Please choose **only one** of the following:

- Not at all
- About once a year
- About once a month
- About once a week
- About once a day or more often

How many years have you been doing code reviews?

Please choose **only one** of the following:

- I have never done a code review
- 1 year or less
- 2 years
- 3 - 5 years
- 6 - 10 years
- 11 years or more

How often do you currently perform code reviews?

Please choose **only one** of the following:

- Not at all
- About once a year
- About once a month
- About once a week
- About once a day or more often

Pilot

You have been part of the pilot study. Therefore, we would like to ask for your feedback on the survey you have just filled in.

Have you understood the questions and response options in this survey?

Please choose **only one** of the following:

- Yes
- No

Make a comment on your choice here:

Do you have any other feedback on the survey?

Please write your answer here:

What was unclear or confusing? Were the content and format clear to you?

Thank you for your participation!

We are grateful that you helped us to understand the role of skills for code reviews and your experience.

Please, contact us in case of any questions.

Submit your survey.
Thank you for completing this survey.