Demographics:

1. What best describes your main role?
   - ❏ Development
   - ❏ Testing
   - ❏ Project management
   - ❏ Other [ ]

2. How many years of experience do you have in software development/testing/project management?
   - ❏ 10+ years
   - ❏ 7 - 10 years
   - ❏ 4 - 7 years
   - ❏ 1 - 3 years
   - ❏ 0 - 1 years

3. How long have you been involved in smart contract development?
   - ❏ 0 - 1 year
   - ❏ 1 - 2 years
   - ❏ 2 - 3 years
   - ❏ 3+ years

4. What is your gender?
   - ❏ Male
   - ❏ Female
   - ❏ Prefer not to disclose

5. What is your current country of residence?
   - ❏ [Select options; including prefer not to disclose]

6. What is your highest educational qualification?
   - ❏ Less than high school
   - ❏ High school
   - ❏ Trade/technical school
   - ❏ Some college, no degree
   - ❏ Associate degree
   - ❏ Bachelor's degree
   - ❏ Advanced degree (Master's, Ph.D., M.D.)
   - ❏ Other [ ]

7. What kind of projects do you spend your time on?
   - ❏ Mostly open source projects
   - ❏ Mostly closed source projects
   - ❏ More or less equal time on open and closed source projects

8. What kind of blockchains do you develop smart contracts on?
- ❏ Public blockchain, e.g., Ethereum
- ❏ Non-public blockchain
- ❏ Both

General questions about smart contract development:

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1. In which domains do you develop smart contracts? If you have developed contracts in more than 3 domains, please select the top 3 -- based on how many contracts you have developed in those domains.
- ❏ Financial
- ❏ Notary
- ❏ Wallet
- ❏ Game
- ❏ Library
- ❏ Other [ ]

2. What do you think are the major differences between smart contract development and traditional software development?
- ❏ A much higher requirement for code security
- ❏ Lack of mature tools (e.g., debuggers)
- ❏ Lack of online resources (e.g., best practice, reference code, community)
- ❏ Difficult/Impossible to change code after deployment
- ❏ Executing code under a resource constrainted environment (e.g., gas, stack, storage)
- ❏ New programming languages (e.g., Solidity) and virtual machines
- ❏ Other [ ]

3. Please choose up to 3 top challenges of smart contract development.
- ❏ Hard to guarantee the security of smart contracts
- ❏ Hard to handle performance problems
- ❏ Current programming languages (e.g., Solidity) have a number of limitations
- ❏ The Ethereum virtual machine (e.g., EVM) that runs smart contracts have a number of limitations
- ❏ Lack of powerful tools (e.g., debugger, testing framework)
- ❏ Limited online learning resources and community support (e.g., to perform code audit prior to deployment)
- ❏ Other [ ]

4. As a common programming language for smart contracts, which of the following improvements for **Solidity** would you like to see? Please select up to 3 options.
- ❏ More general purpose libraries (e.g., mathematical computation)
- ❏ More standard interfaces (e.g., ERC20)
- ❏ Loosen the limited number of global and local variables
- ❏ Better support for security checking of data types
- ❏ More convenient and secure way to call external functions

- ❏ More powerful memory management
- ❏ More powerful error logging/reporting functions
- ❏ I think Solidity is good enough
- ❏ Other [ ]

5. Which of the following improvements for **EVM** would you like to see?
- ❏ Improve execution speed of byte code
- ❏ Be able to support other traditional languages, e.g., C
- ❏ Better support in debugging
- ❏ Loosen the stack size limitation
- ❏ I think EVM is good enough
- ❏ Other [ ]

Coding:

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6. Do existing tools support you well in coding?
- ❏ Yes
- ❏ No
- ❏ Kind of

7. What kind of tools do you desire most for developing smart contracts? Please select up to 3 options.
- ❏ Powerful IDEs
- ❏ Powerful interactive/step-through debuggers
- ❏ Source-code-level gas estimation tools
- ❏ Code refactoring tools
- ❏ Code auditing tools
- ❏ Visualization tools for, e.g., for visualizing call graphs of smart contracts
- ❏ Formal verification tools
- ❏ Other [ ]

8. Are you familiar with some common security bugs about smart contracts (e.g., re-entrancy bug)?
- ❏ Yes
- ❏ No
- ❏ Kind of

9. Do you often try to defend against those potential security bugs during smart contract development?
- ❏ Yes
- ❏ No
- ❏ Sometimes

10. Do you often reuse existing open source smart contract libraries during development?
- ❏ Yes

- ❏ No
- ❏ Sometimes

11. Do you often take a close look at libraries' code before reusing them for your smart contract development?
- ❏ Yes
- ❏ No
- ❏ Sometimes

12. Do you think the existing libraries are enough for your smart contract development?
- ❏ Yes
- ❏ No

13. Do you often pay attention to gas consumption when developing smart contracts?
- ❏ Yes
- ❏ No
- ❏ Sometimes

14. Please indicate your agreement towards the following statements related to gas.
[options: 1,2,3,4,5; 5=strongly agree; 1= strongly disagree]
- ❏ We often encountered transaction failures due to running out of gas.
- ❏ Doing gas optimization is always painful especially for complex applications.
- ❏ We seldom or never test smart contracts on real main blockchain becasue we need to pay gas fees.

15. Which kind of code review do you often conduct when developing smart contracts?
- ❏ Peer code review within team
- ❏ Request help from GitHub community
- ❏ Hire service of 3rd-party code review agency
- ❏ Other [ ]

16. Please indicate your agreement towards code review of smart contracts.
[options: 1,2,3,4,5; 5=strongly agree; 1=strongly disagree]
- ❏ Code review is an essential way to ensure the correctness of smart contracts
- ❏ Code review helps to improve developer skills in writing smart contracts
- ❏ Code review of smart contracts is very time consuming
- ❏ It is hard to find qualified developers to find security flaws in smart contract code
- ❏ Smart contract code review should be conducted by multiple parties

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Debugging:

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17. Do you think it is difficult to debug during smart contract development?
- ❏ Yes
- ❏ No

18. Why do you think it is difficult to debug smart contracts? shown if 18 selected Yes.

- ❏ There are no error messages when transaction fails
- ❏ There are no powerful interactive debuggers
- ❏ Other

19. What is your general way to debug when bugs occur?
    - ❏ Use existing debugging tools, e.g., Remix or trufle debugger
    - ❏ Manually comment out code step by step to narrow down buggy code search space
    - ❏ Write additional methods/events to check variables and transaction states
    - ❏ Request the help of GitHub community or other developers through some forums, e.g., Stack Overflow
    - ❏ Other [ ]

Testing:

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20. Do you think it is easier to test smart contracts than other software projects?
    - ❏ Yes
    - ❏ No
    - ❏ Similar

21. What are the major challenges of testing smart contract? please choose up to 3 options.
    - ❏ Difficult to consider all corner cases and scenarios
    - ❏ Potential unseen flaws in compilers and virtual machines
    - ❏ No mature testing frameworks like other languages, e.g., Java
    - ❏ No tools to measure the quality of smart contract test suite
    - ❏ Testing needs to be done in an asynchronous way (i.e., need to wait for the mining of transactions)
    - ❏ Testing consume gases if tested on testnets or mainnet
    - ❏ Lack of useful guidance for testing, e.g., best practice, tutorials, etc.
    - ❏ Other [ ]

22. What kind of testing do you often conduct?
    - ❏ Unit testing
    - ❏ Integration testing
    - ❏ Performance testing
    - ❏ Other [ ]

23. What kind of code coverage do you often use when testing smart contracts?
    - ❏ Function coverage
    - ❏ Statement coverage
    - ❏ Branch coverage
    - ❏ Condition coverage
    - ❏ Other [ ]

Management:

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24. Is it different to manage smart contract projects than traditional software projects?

- ❏ Yes
- ❏ No

25. Why do you think it is different to manage smart contract projects than traditional software projects? shown if 24 selected Yes.

- ❏ [ ]

26. What tools do you often use to manage your smart contract projects?

- ❏ GitHub
- ❏ GitLab
- ❏ Bug tracking systems, e.g., JIRA
- ❏ Version control systems, e.g., Git
- ❏ Redmine
- ❏ Other [ ]

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27. Is there anything else you would like to tell us about smart contract development? This would include: problems that were not addressed in previous questions, features that you wish to see, etc.

- ❏ [ ]

28. If you would like to participate in a raffle for a $50 (USD) Amazon gift card, please enter your email here. Thanks!

- ❏ Email Address: [ ]
