

## Post-CTF Questionnaire

### Block 1

You are being invited to participate in a research study on **Human-AI Collaboration Security**. This study is conducted for academic purposes and aims to understand to what extent AI agent can help CTF players solve challenges and how can the interaction workflow between humans and AI be improved.

You may choose to withdraw from the survey at any time (**but with no rewards**).

By agreeing to participate:

- You acknowledge that your responses will be used for research, analysis, and academic publication.
- You understand that no personally identifiable information (PII) will be collected, and all responses will be anonymized and handled with strict confidentiality. Your information will only be used to confirm participation and distribute rewards.
- You confirm that you meet all CTF competition registration requirements and understand the nature and purpose of this research.

This survey may cost **about 15 to 20 minutes**. If you have any questions about the study, you may contact the research team before continuing.

Do you consent to participate in this study under the terms described above?

- ☐ By checking this box, I confirm that I have read and agreed to the statement above.

Please enter your email address (the one you used to fill in registration form):

## Block 2

What kind of AI did you use in this competition?

*(If you used both, just choose the one you used most)*

- ☐ CTFriend
- ☐ Other AI chatbots (e.g., ChatGPT, Gemini, Copilot etc.)

Block 3

How did CTFriend assist you/your team successfully in the competition? Why do you think it helps you? Please fill the table to show your evidence.

(\* After validation, each successful challenge + valid evidence of using CTFriend will be rewarded \$2)

Tips:

[Log Reference]

- 1. Please provide the Chat Name of the relevant chat log in Log Reference, which can be found in the left side of the CTFriend website and looks like "Chat from 14:21".
- 2. Please provide all necessary logs for one successful assistance.

	Challenge	Log Referenc	Justification
1	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>
2	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>
3	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>
4	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>
5	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>

	Challenge	Log Referenc	Justification
6	<div></div>	<div></div>	<div></div>
7	<div></div>	<div></div>	<div></div>
8	<div></div>	<div></div>	<div></div>
9	<div></div>	<div></div>	<div></div>
10	<div></div>	<div></div>	<div></div>

How did AI chatbots assist you/your team successfully in the competition? Why do you think it helps you? Please fill the table to show your evidence.

(\* After validation, each successful challenge + valid evidence of using AI chatbots will be rewarded \$2)

Tips:

[Log Reference]

- 1. Please provide all necessary logs (chat links) for one successful assistance.
- 2. If you cannot get your chat links currently, please contact the on-site team to collect later.

	Challenge	Log Reference	Justification
1	<div>▼</div>		
		//	//
2	<div>▼</div>		
		//	//
3	<div>▼</div>		
		//	//
4	<div>▼</div>		
		//	//
5	<div>▼</div>		
		//	//
6	<div>▼</div>		
		//	//
7	<div>▼</div>		
		//	//
8	<div>▼</div>		
		//	//
9	<div>▼</div>		
		//	//
10	<div>▼</div>		
		//	//

Did CTFriend fail to help you/your team solve problems?  
Why do you think it fail? Please fill the table to show your evidence.

Tips:

[Log Reference]

- 1. Please provide the Chat Name of the relevant chat log in Log Reference, which can be found in the left side of the CTFriend website, like "Chat from 14:21".
- 2. Please provide all necessary logs for one challenge.

	Challenge	Log Reference	Justification
1	<div><div></div><div></div></div>	<div></div>	<div></div>
2	<div><div></div><div></div></div>	<div></div>	<div></div>
3	<div><div></div><div></div></div>	<div></div>	<div></div>
4	<div><div></div><div></div></div>	<div></div>	<div></div>
5	<div><div></div><div></div></div>	<div></div>	<div></div>
6	<div><div></div><div></div></div>	<div></div>	<div></div>
7	<div><div></div><div></div></div>	<div></div>	<div></div>

	Challenge	Log Reference	Justification
8	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>
9	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>
10	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>

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Why do you think it fail? Please fill the table to show your evidence.

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2	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>	<div><div></div><div></div><div></div></div>

	Challenge	Log Reference	Justification
3	<div></div>		
4	<div></div>		
5	<div></div>		
6	<div></div>		
7	<div></div>		
8	<div></div>		
9	<div></div>		
10	<div></div>		

Block 4

What kinds of questions did you ask most when using CTFriend?



- ☐ The challenge itself
- ☐ Technical questions
- ☐ Both

What kinds of questions did you ask most when using AI chatbots?

- ☐ The challenge itself
- ☐ Technical questions
- ☐ Both

Did the CTFriend help you solve any challenge you could not have solved otherwise?

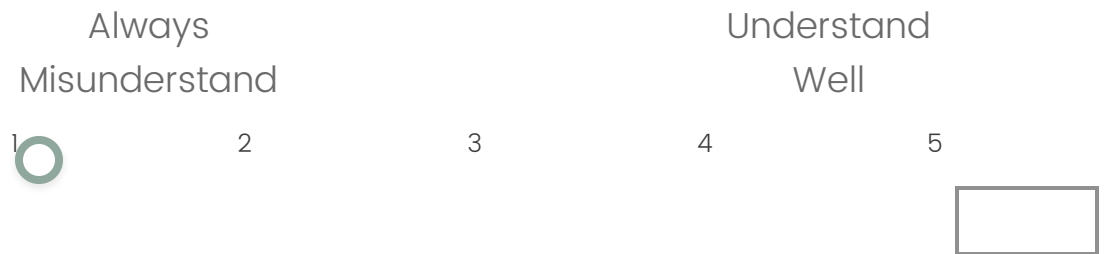
- ☐ Yes
- ☐ No
- ☐ Not Sure

Did the AI chatbots help you solve any challenge you could not have solved otherwise?

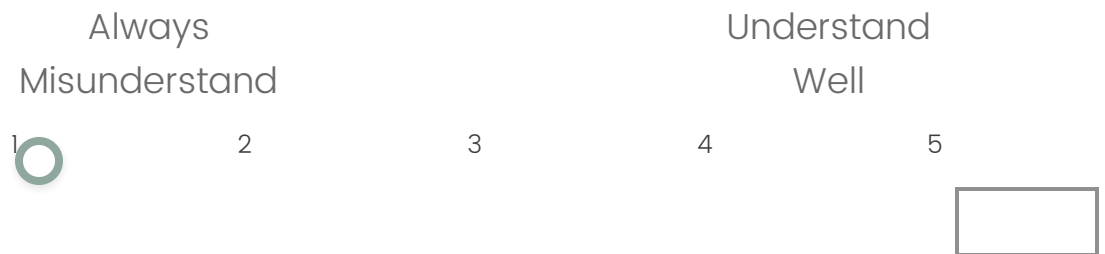
- ☐ Yes
- ☐ No
- ☐ Not Sure

## Block 5

How well did CTFriend understand your questions in this competition?



How well did AI chatbots understand your questions in this competition?



Which categories did you use CTFriend to assistant most/least?

Category

Most



Least



Which categories did you use AI chatbots to assistant most/least?

Category

Most



Least



What kinds of tasks did you use CTFriend for? (Select all that apply)

- ☐ Challenge understanding
- ☐ Ask general tech questions
- ☐ Exploit debugging
- ☐ Decompilation analysis
- ☐ Tool usage help (e.g., Ghidra, Cyber chef)
- ☐ Generating or verifying code
- ☐  Other:

What kinds of tasks did you use AI chatbots for? (Select all that apply)

- ☐ Challenge understanding
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- ☐ Exploit debugging
- ☐ Decompilation analysis
- ☐ Tool usage help (e.g., Ghidra, Cyber chef)
- ☐ Generating or verifying code
- ☐  Other:

Did you try different LLMs in CTFriend for the same challenge? Did it help you solve the challenge?

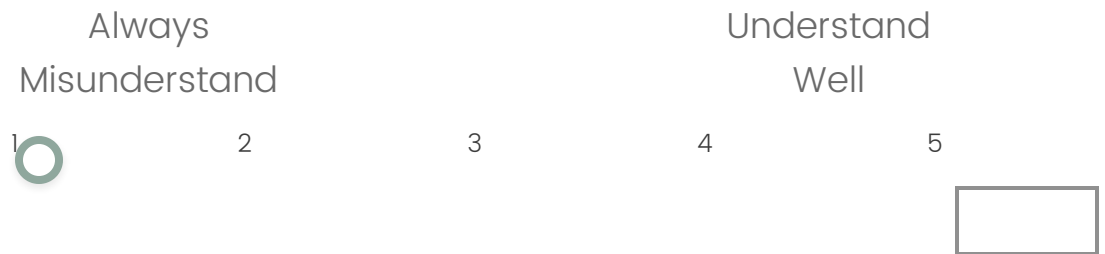
- ☐ Yes, and it helped
- ☐ Yes, but it did not help
- ☐ No

Did you try different LLMs (chatbots) in the same challenge? Did it help you solve the challenge?

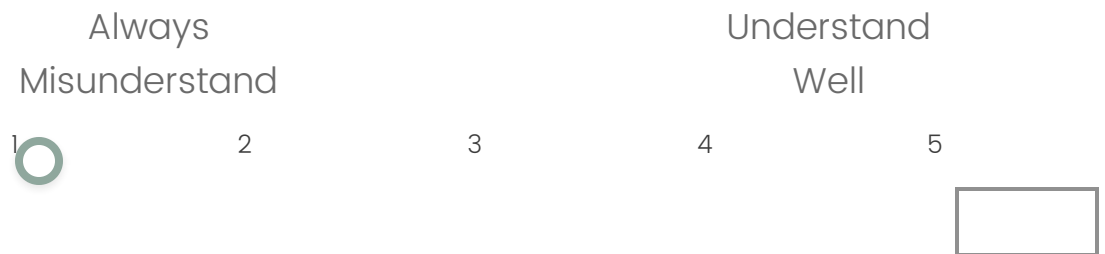
- ☐ Yes, and it helped
- ☐ Yes, but it did not help
- ☐ No

## Block 6

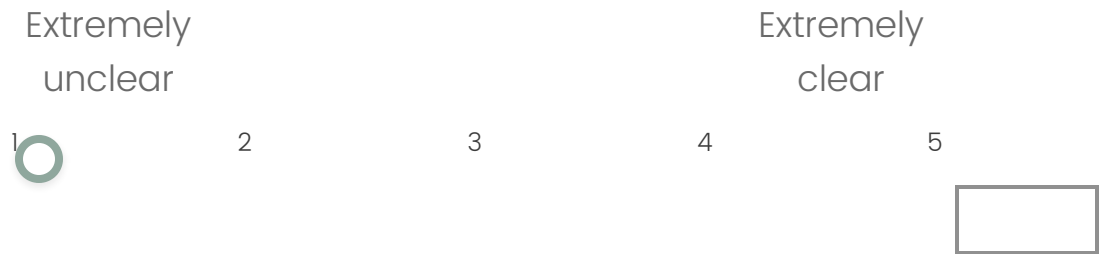
How well did CTFriend understand your **code or technical problems** in this competition?



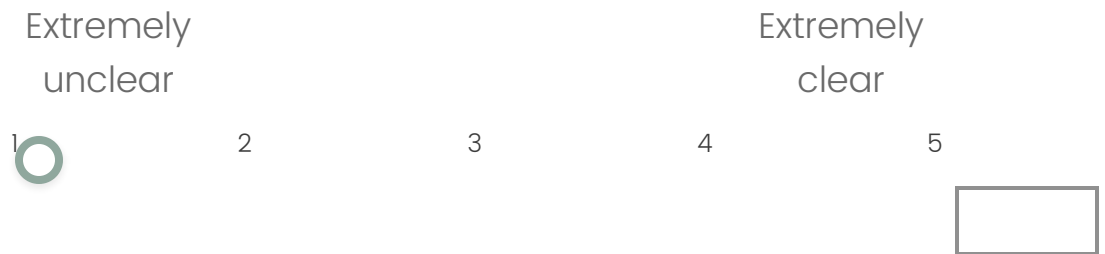
How well did AI chatbots understand your **code or technical problems** in this competition?



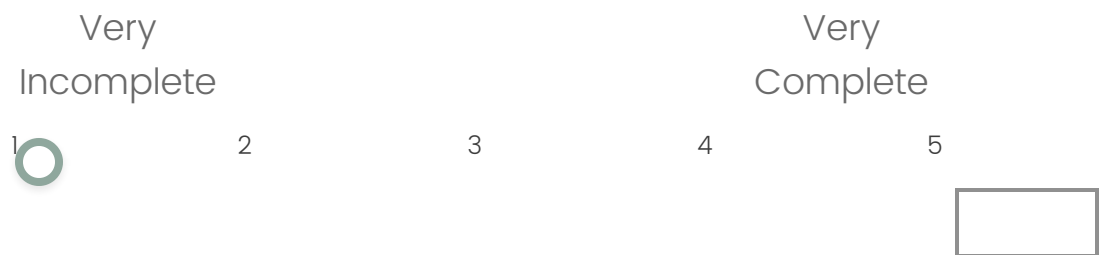
**(Clarity)** How clear (easy to understand) was the CTFriend's solution?



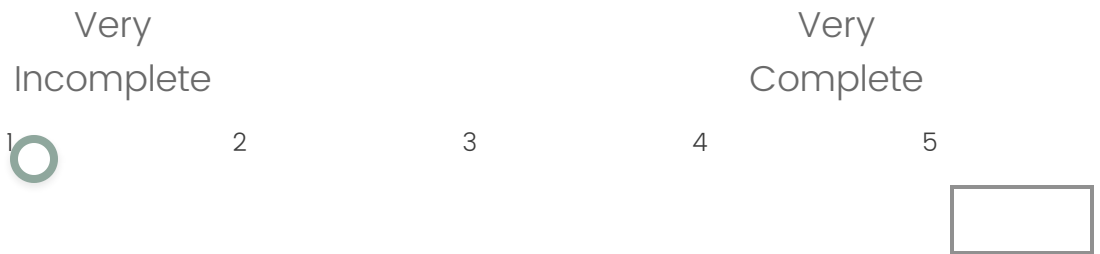
**(Clarity)** How clear (easy to understand) was the AI chatbots' solution?



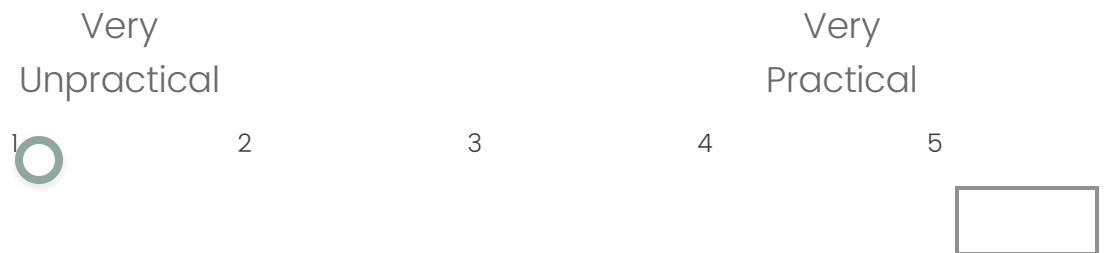
**(Completeness)** To what extent did CTFriend's solutions include all the necessary steps to reach the flag?



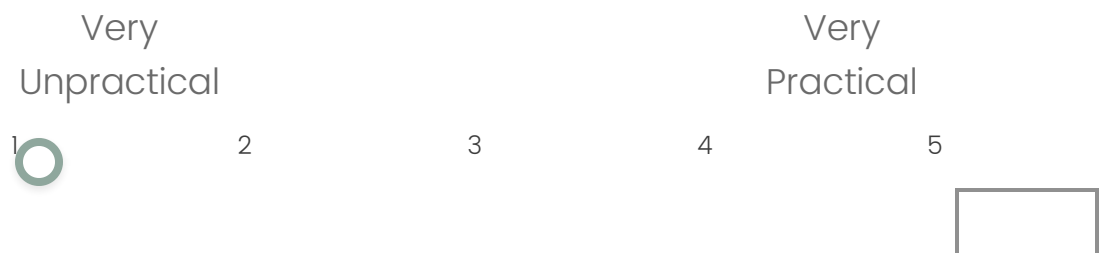
**(Completeness)** To what extent did AI chatbots' solution include all the necessary steps to reach the flag?



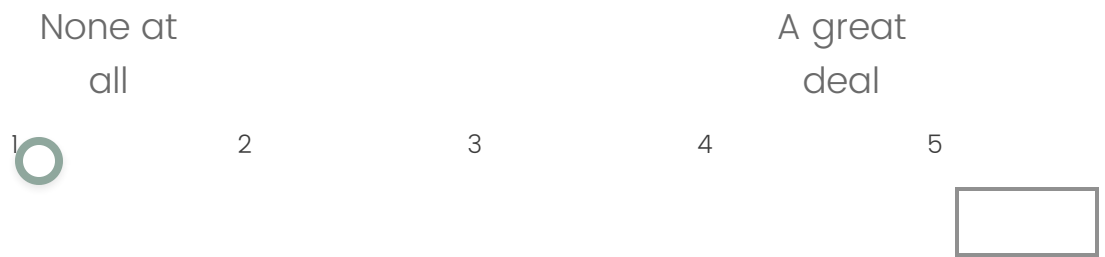
**(Actionability)** How actionable was CTFriend's solution?  
(You could directly follow the steps to make progress toward the flag)



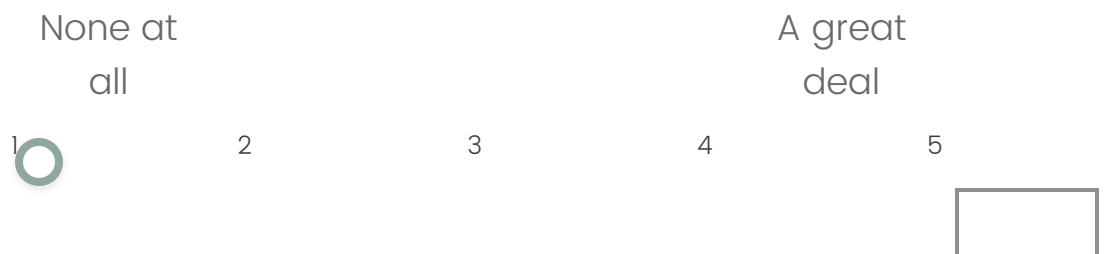
**(Actionability)** How actionable was AI chatbots' solution?  
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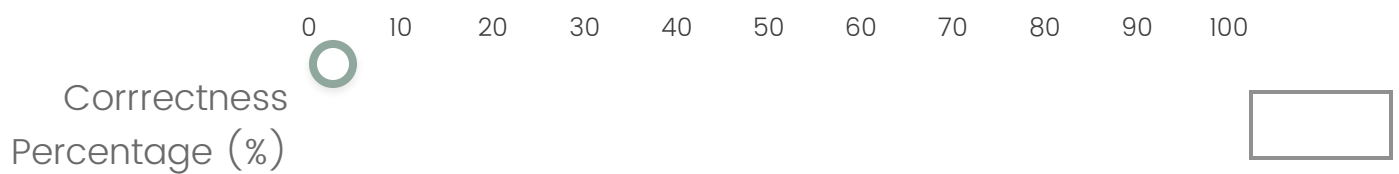
How much additional effort did you need to put in to make CTFriend's solution workable?



How much additional effort did you need to put in to make the AI chatbots' solution workable?

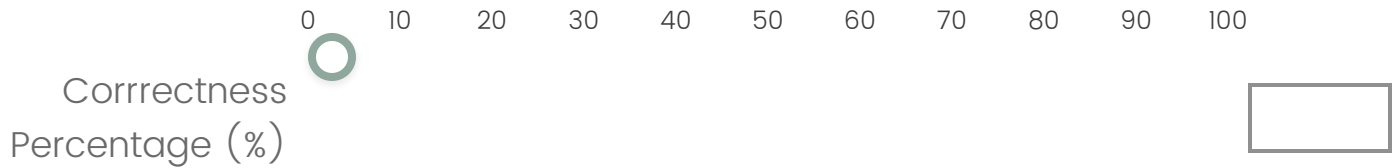


**(Correctness)** How correct were the answers provided by CTFriend overall?





**(Correctness)** How correct were the answers provided by AI chatbots overall?



In this CTF competition, what kinds of errors most frequently occurred in CTFriend's responses? (Select all that apply)

- ☐ Hallucinated content/wrong facts
- ☐ Flawed reasoning
- ☐ Broken or missing references (e.g., invalid links, incomplete citations)
- ☐ Non-runnable code (syntax errors, missing dependencies, environment issues)
- ☐ Irrelevant responses (did not address the question or challenge)
- ☐ missing the key components
- ☐  Other (Please enter your error type)

In this CTF competition, what kinds of errors most frequently occurred in AI chatbots' responses? (Select all that apply)

- ☐ Hallucinated content/wrong facts

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- ☐ Broken or missing references (e.g., invalid links, incomplete citations)
- ☐ Non-runnable code (syntax errors, missing dependencies, environment issues)
- ☐ Irrelevant responses (did not address the question or challenge)
- ☐ missing the key components
- ☐  Other (Please enter your error type)

How did you handle the errors found in CTFriend's responses? (Select all that apply)

- ☐ Asked the same question again to get a different answer
- ☐ Pointed out the errors and ask AI to correct them
- ☐ Gave up using CTFriend in current challenge
- ☐ Did not realize the error and follow it blindly
- ☐  Other (Please enter your action)

How did you handle the errors found in AI chatbots' responses? (Select all that apply)

- ☐ Asked the same question again to get a different answer
- ☐ Pointed out the errors and ask AI to correct them
- ☐ Gave up using AI chatbots in current challenge
- ☐ Did not realize the error and follow it blindly

☐  Other (Please enter your action)

What was your interaction pattern with CTFriend in this competition? (Select all that apply)

- ☐ Trial-and-Error: The user experiments with different inputs to explore how the AI responds
- ☐ Confirmation-Seeking: The user already has an idea or answer in mind and uses AI to validate or confirm it
- ☐ Rejection of Suggestions: The user actively rejects AI's outputs or recommendations and redirects the interaction
- ☐ Delegation: The user delegates an entire task or sub-task to the AI, focusing only on the results
- ☐ Collaborative Refinement: The user and AI iteratively co-develop a task output, improving it step by step
- ☐  Other (Please enter your own pattern)

What was your interaction pattern with the AI chatbots in this competition? (Select all that apply)

- ☐ Trial-and-Error: The user experiments with different inputs to explore how the AI responds
- ☐ Confirmation-Seeking: The user already has an idea or answer in mind and uses AI to validate or confirm it

- ☐ Rejection of Suggestions: The user actively rejects AI's outputs or recommendations and redirects the interaction
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- ☐ Collaborative Refinement: The user and AI iteratively co-develop a task output, improving it step by step
- ☐  Other (Please enter your own pattern)

How did you adjust your behaviors with collaborating with CTFriend as the competition goes on? (Select all that apply)

- ☐ Tend to use CTFriend more
- ☐ Tend to use CTFriend less
- ☐ Change query ways when using CTFriend
- ☐ Skip the challenge you cannot solve in that moment
- ☐ Use CTFriend to assist in difficult challenges but not in easy one
- ☐  Other (Please enter your action)

How did you adjust your behaviors with collaborating with AI chatbots as the competition goes on? (Select all that apply)

- ☐ Tend to use AI chatbots more

- ☐ Tend to use AI chatbots less
- ☐ Change query ways when using chatbots
- ☐ Skip the challenge you cannot solve in that moment
- ☐ Use AI chatbots to assist in difficult challenges but not in easy one
- ☐Other (Please enter your action)

When working on challenges in different levels, who primarily took the lead? You (with CTFriend as an assistant), or CTFriend (with you following its instruction)?

	Leadership
Easy Challenges	<div></div>
Medium Challenges	<div></div>
Hard Challenges	<div></div>

When working on challenges in different levels, who primarily took the lead? You (with AI chatbots as an assistant), or AI chatbots (with you following its instruction)?

## Leadership

Easy  
Challenges

Medium  
Challenges

Hard  
Challenges

## Block 7

Did CTFriend help inspire your problem-solving process or provide any potential hints in this competition?

- ☐ Yes
- ☐ No
- ☐ Not Sure

Did AI chatbots help inspire your problem-solving process or provide any potential hints in this competition?

- ☐ Yes
- ☐ No
- ☐ Not Sure

How did CTFriend influence your task solving time in this competition?

- ☐ Save my time
- ☐ Waste my time
- ☐ No Influence

How did AI chatbots influence your task solving time in this competition?

- ☐ Save my time
- ☐ Waste my time
- ☐ No Influence

Why did CTFriend help to save your time? (Select all that apply)

- ☐ I did not need to waste on searching on Google
- ☐ It helped to call the function directly
- ☐ It helped to find the bug
- ☐ It gave me some hints
- ☐ It helped to write the code
- ☐  Other (Please enter your reason )

Why did AI chatbots help to save your time? (Select all that apply)

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- ☐ It helped to call the function directly
- ☐ It helped to find the bug
- ☐ It gave me some hints
- ☐ It helped to write the code
- ☐  Other (Please enter your reason )

Why did CTFriend waste your time? (Select all that apply)

- ☐ It gave me wrong responses
- ☐ It gave me useless responses
- ☐ The code it provided did not work
- ☐ It could not complete my task
- ☐  Other (Please enter your reason)

Why did AI chatbots waste your time? (Select all that apply)



- ☐ It gave me wrong responses
- ☐ It gave me useless responses
- ☐ The code it provided did not work
- ☐ It could not complete my task
- ☐  Other (Please enter your reason)

## Block 8

Did CTFriend give you the answer/code directly, or show the whole reasoning progress?

- ☐ Only the answer
- ☐ Whole reasoning process
- ☐ It depends on my prompt

Did AI chatbots give you the answer/code directly, or show the whole reasoning progress?

- ☐ Only the answer
- ☐ Whole reasoning process
- ☐ It depends on my prompt

## How did you use CTFriend's outputs?

- ☐ Run it directly
- ☐ Understand the outputs first and then run it
- ☐  Other (Please enter your action)

## How did you use AI chatbots' outputs?

- ☐ Run it directly
- ☐ Understand the outputs first and then run it
- ☐  Other (Please enter your action)

## Do you think CTFriend always show reasonable steps?

- ☐ Yes
- ☐ No
- ☐ Nor Sure

## Do you think AI chatbots always show reasonable steps?

- ☐ Yes
- ☐ No

☐ Nor Sure

When the CTFriend's outputs did not work (could not help you solve your problem), what did you do next?

- ☐ Continue to interact with it until finding the flag
- ☐ Swith to other LLMs
- ☐ Stop using CTFriend and find the flag by myself
- ☐  Other (Please enter your action)

When the AI outputs did not work (could not help you solve your problem), what did you do next?

- ☐ Continue to interact with it until finding the flag
- ☐ Swith to other chatbots
- ☐ Stop using AI and find the flag by myself
- ☐  Other (Please enter your action)

Do you think CTFriend is “smarter” than you in CTF?

- ☐ Yes
- ☐ No

☐ Not Sure

Do you think AI chatbots are “smarter” than you in CTF?

- ☐ Yes
- ☐ No
- ☐ Not Sure

Why do you think CTFriend is smarter than you in this CTF competition? (Select all that apply)

- ☐ Because it always give me some useful hints
- ☐ Because it can complete the task in shorter time
- ☐ Because it knows more than me in this area
- ☐ Because its solutions are better than mine
- ☐  Other (Please enter your reason)

Why do you think AI chatbots are smarter than you in this CTF competition? (Select all that apply)

- ☐ Because it always give me some useful hints
- ☐ Because it can complete the task in shorter time
- ☐ Because it knows more than me in this area

- ☐ Because its solutions are better than mine
- ☐  Other (Please enter your reason)

## Block 9

In the future CTFs, do you want to use CTFriend to assist?

- ☐ Yes
- ☐ Maybe
- ☐ No

In the future CTFs, do you want to use AI chatbots to assist?

- ☐ Yes
- ☐ Maybe
- ☐ No

Based on your experience in this CTF, how many challenges do you expect CTFriend to solve in future CTFs?

- ☐ < 5
- ☐ 5 – 8
- ☐ 9 – 12

☐ > 12

Based on your experience in this CTF, how many challenges do you expect AI chatbots to solve in future CTFs?

☐ < 5

☐ 5 – 8

☐ 9 – 12

☐ > 12

## Block 12

Based on this experiment, what kinds of tasks do you want to use CTFriend in the future? (Select all that apply)

☐ Information Processing and Collection (data collection, Info analysis, etc.)

☐ Content Generation (text generation, image generation, file generation, etc.)

☐ Decision Making (recommendation, prediction, etc.)

☐ Interaction and Communication (language translation, chat, education, etc.)

☐ Automation and Execution (testing, smart control, coding, etc.)

☐ Creativity (artistic reaction, research support, etc.)

☐  Other (Please enter your task)

Based on this experiment, what kinds of tasks do you want to use AI chatbots in the future? (Select all that apply)

- ☐ Information Processing and Collection (data collection, Info analysis, etc.)
- ☐ Content Generation (text generation, image generation, file generation, etc.)
- ☐ Decision Making (recommendation, prediction, etc.)
- ☐ Interaction and Communication (language translation, chat, education, etc.)
- ☐ Automation and Execution (testing, smart control, coding, etc.)
- ☐ Creativity (artistic reaction, research support, etc.)
- ☐  Other (Please enter your task)

**If you have any questions about this survey, please contact research team (<Researcher 1 Email>, <Researcher 2 Email>, <Researcher 3 Email>, <Researcher 4 Email>)**

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