

FPV Week 1: Implications, Assertions and Conditions



Exercises

- There will be tutorial exercises every week
- In non-programming weeks, there will be quizzes to be solved during tutorials
- In programming weeks, there will be homework
- All exercises will be managed on Artemis
artemis.ase.in.tum.de
- Programming exercises will be graded automatically, with secret tests
- This means you see your results already before the deadline ("What you see is what you get")

- Successful participation ($\geq 70\%$) in quizzes and programming tasks will lead to a bonus of 0.3 in the final exam, provided that you passed the exam.
- Programming homework and quizzes are to be submitted individually.
- Discussing solutions before the end of the week is considered plagiarism.
- Plagiarism will not be tolerated and will (at the very least) lead to exclusion from the bonus system

Material




The screenshot shows a GitHub repository page for 'Funky-Punky / FPV_SoSe23_Fr-14-16'. The repository is public and has a dark theme. The main content area shows a commit history table with two entries: one for '.gitignore' and one for 'README.md'. Below the table is a preview of the 'README.md' file, which contains text about FPV tutorial materials and a Zulip stream link. The right sidebar contains sections for 'About', 'Releases', and 'Packages', all of which are currently empty or have no content.

Funky-Punky / **FPV_SoSe23_Fr-14-16** Public

[Code](#) [Issues](#) [Pull requests](#) [Actions](#) [Projects](#) [Wiki](#) [Security](#) [Insights](#) [Settings](#)

main 1 branch 0 tags

Go to file Add file Code

 Funky-Punky	Update .gitignore	1e0ab34 37 minutes ago 3 commits
 .gitignore	Update .gitignore	37 minutes ago
 README.md	Create README.md	38 minutes ago

README.md

Materialien für das FPV Tutorium von Jonas im SoSe23 Freitag von 14 bis 16 Uhr

Hier ist der Zulip Stream: https://zulip.in.tum.de/#narrow/stream/1643-FPV_Fr-14-16

About

No description, website, or topics provided.

Readme

0 stars

1 watching

0 forks

Releases

No releases published

[Create a new release](#)

Packages

No packages published

[Publish your first package](#)

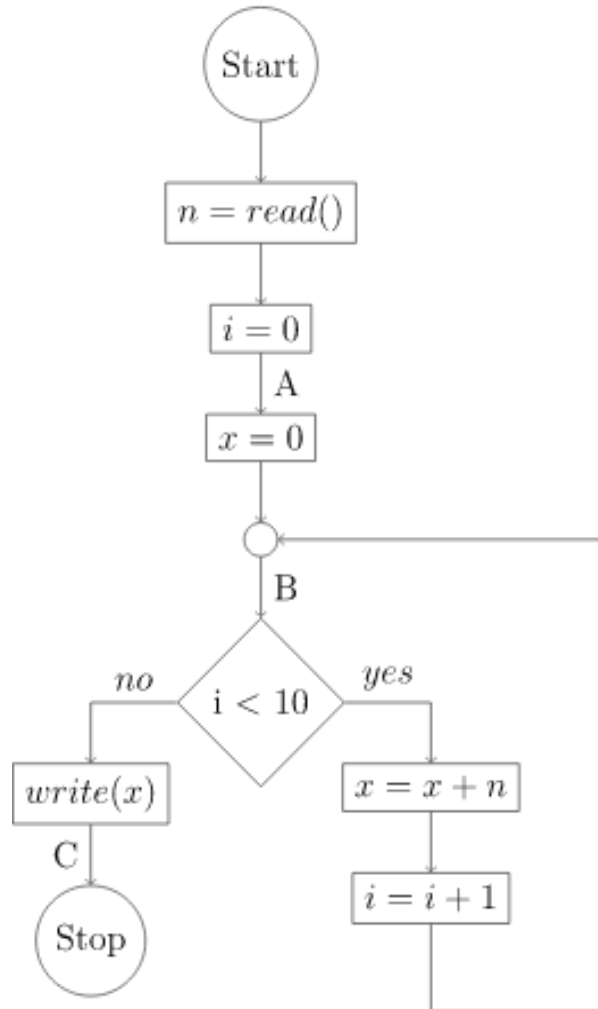
https://github.com/Funky-Punky/FPV_SoSe23_Fr-14-16

Quiz

Week 01 Tutorial 01 Recap: Implications

1. $x = 1 \implies 0 < x$
2. $x < 6 \implies x = 3$
3. $x > 0 \implies x \geq 0$
4. $x = -2 \implies x < -1 \vee x > 1$
5. $x = 0 \vee x = 7 \implies 4 \neq x$
6. $x = 1 \implies x \leq 3 \wedge y > 0$
7. $x < 8 \wedge y = x \implies y \neq 12$
8. $x = 1 \vee y = 1 \implies x > 0$
9. $x \neq 5 \implies \text{false}$
10. $\text{true} \implies x \neq y$
11. $\text{false} \implies x = 1$
12. $x \geq 1 \implies 2x + 3 = 5$
13. $A \wedge x = y \implies A$
14. $B \implies A \vee B$
15. $A \implies (B \implies A)$
16. $(A \implies B) \implies A$

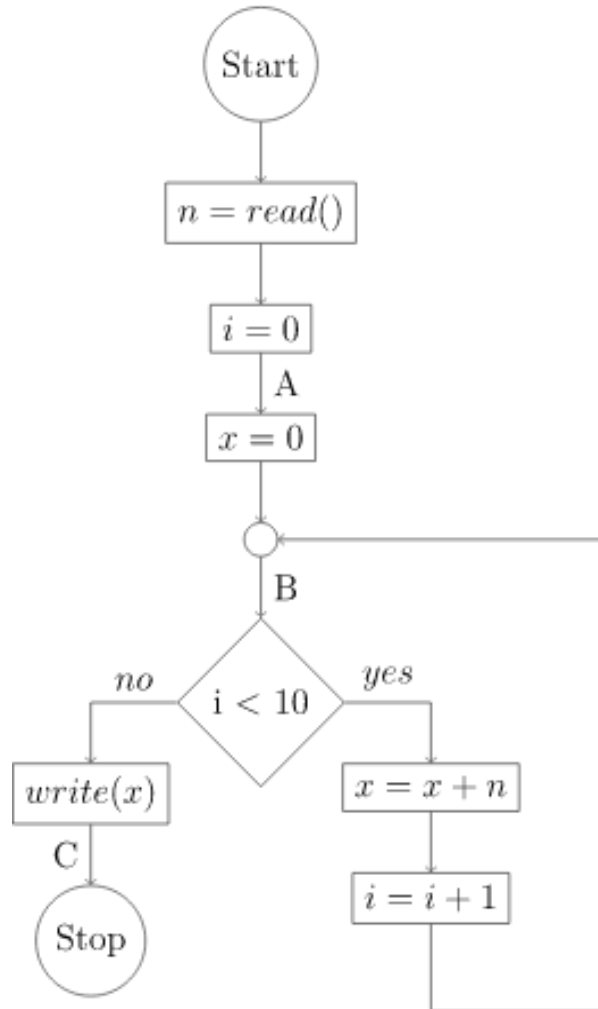
Week 01 Tutorial 02 Assertions



1. Which of the following assertions hold at point **A**?

- a) $i \geq 0$
- b) $x = 0$
- c) $i \leq 10 \wedge x \neq 0$
- d) *true*
- e) $i = 0$
- f) $x = i$

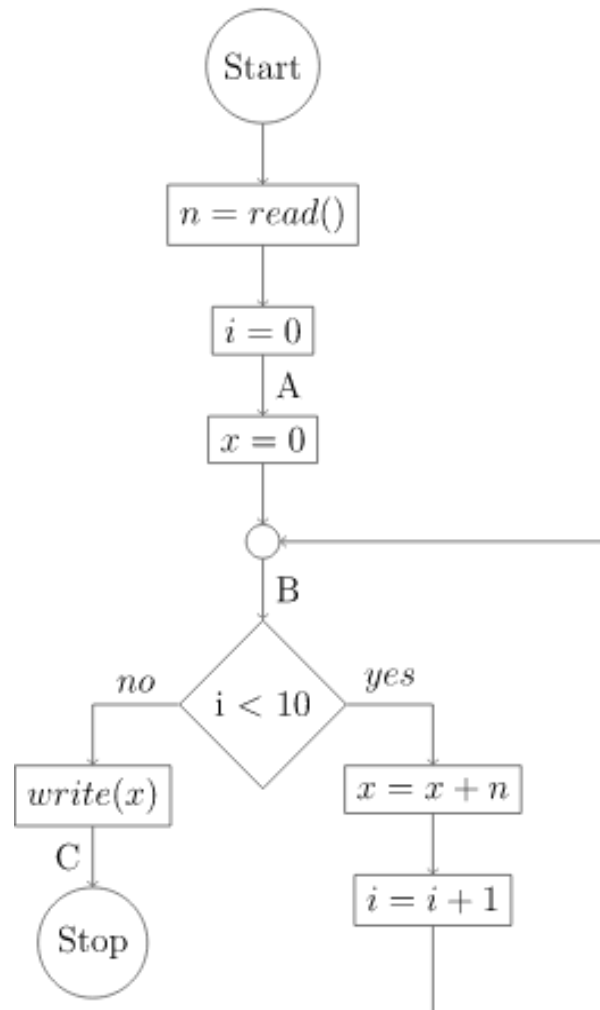
Week 01 Tutorial 02 Assertions



2. Which of the following assertions hold at point B ?

- a) $x = 0 \wedge i = 0$
- b) $x = i$
- c) $i < x$
- d) $0 \leq i \leq 10$
- e) $i \geq 0 \wedge x \geq 0$
- f) $n = 1 \implies x = i$

Week 01 Tutorial 02 Assertions



3. Which of the following assertions hold at point C ?

- a) $i \geq 0$
- b) $i = 10$
- c) $i > 0$
- d) $x \neq n$
- e) $x = 10n$
- f) $x = i * n \wedge i = 10$

Week 01 Tutorial 03 The Strong and the Weak

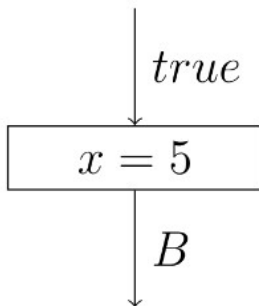
3. Which of the following assertions hold at point C ?

- a) $i \geq 0$
- b) $i = 10$
- c) $i > 0$
- d) $x \neq n$
- e) $x = 10n$
- f) $x = i * n \wedge i = 10$

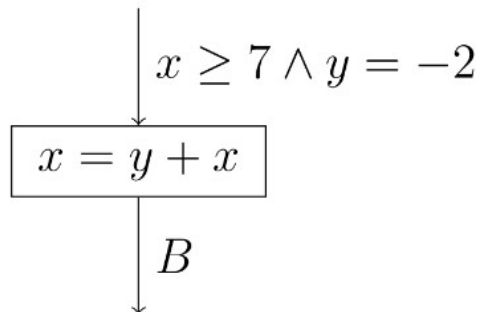
1. When annotating the control flow graph, can you say that one of the given assertions is "better" than the others?
2. Can you arrange the given assertions in a meaningful order?
3. How can you define a *stronger than* relation formally?
4. How do *true* and *false* fit in and what is their meaning as an assertion?
5. What are the strongest assertions that still hold at A , B and C ?

Week 01 Tutorial 04 Strongest Postconditions

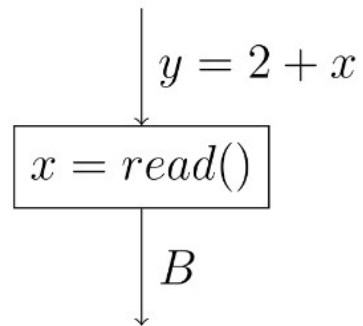
1.



3.

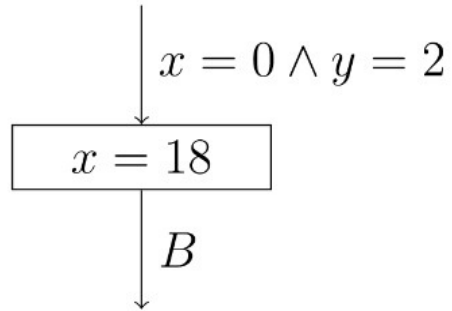


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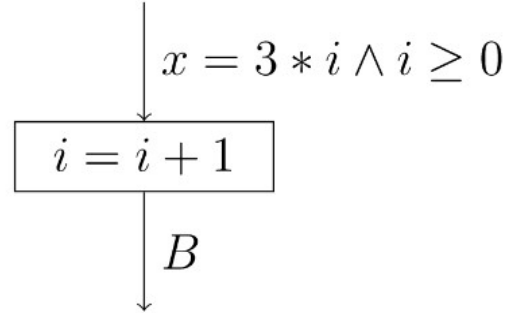


Week 01 Tutorial 04 Strongest Postconditions

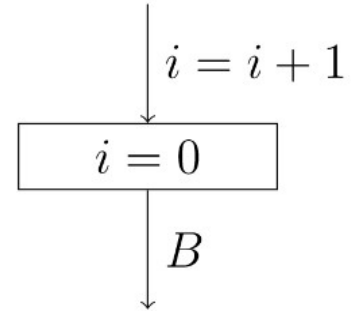
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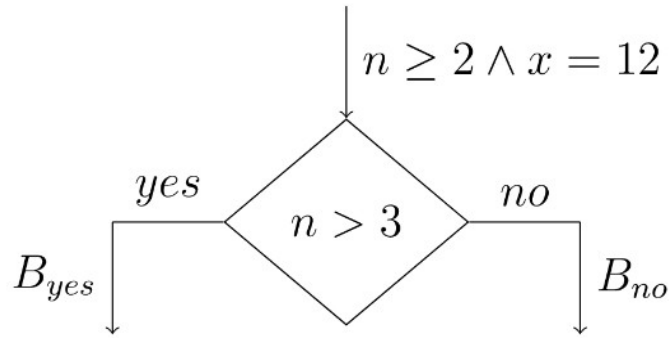


6.

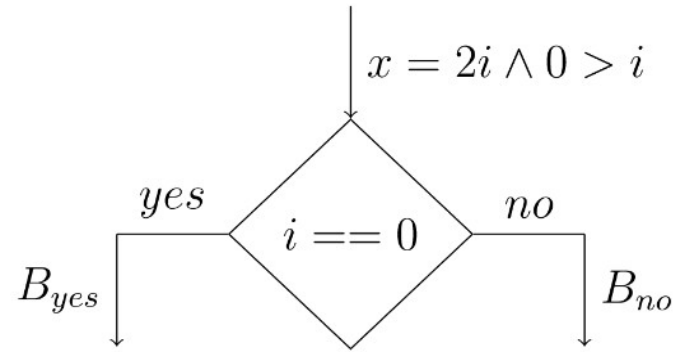


Week 01 Tutorial 04 Strongest Postconditions

7.



8.



9.

