

Help

RELATIVE PERFORMANCE

3:29 / 3:291.0x

Download transcript

.txt

Show Discussion

New Post

1. CHECK YOUR UNDERSTANDING

At the end of a smartphone SoC development project, the chip is found to exceed the target size by 10%, requiring the design team to determine which features to remove to reduce the chip size.

1 A. CHECK YOUR UNDERSTANDING (1/1 point)

A team member determines that removing another team member’s feature (rather than one of their own features, of

course) would reduce the chip size to the target while changing the execution time of a program from 8 seconds to 10 seconds.

What is the performance of the smaller chip without the feature relative to the performance of the current chip design?

Help

- ☐ 0.1
- ☐ 0.25
- ☒ 0.8 ✓
- ☐ 1.25

EXPLANATION

The relative performance can be determined by the ratio of the execution time of the chip with the feature included to the execution time without the feature, or $8/10 = 0.8$.

Hide Answer

You have used 2 of 2 submissions

Show Discussion

 New Post

1 B. CHECK YOUR UNDERSTANDING (1/1 point)

The other team member strikes back, recalling that the first team member's enhancement to integer divide instructions only affected 1 second out of the original execution time of the program without the enhancement (which neither of them can recall). Moreover, removing that enhancement would reduce the chip size even more than removing their feature. However, the first team member argues that their enhancement improved those integer divide instructions by a factor of 10.

What was the execution time of the original program before the inclusion of the integer divide enhancement (**rounded to the nearest integer**)?

- ☐ 7 seconds
- ☐ 8 seconds
- ☒ 9 seconds ✓
- ☐ 10 seconds

EXPLANATION

We first apply Amdahl's Law to determine the execution time that was unaffected by the enhancement:

Help

Execution Time_{enhanced} = (Execution Time affected / Amount of improvement) + Execution Time unaffected

8 = 1/10 + Execution Time unaffected

Execution Time unaffected = 7.9 seconds

Now, if the enhancement were not included, there would be no improvement to the 1 second of execution time involving integer divide instructions.

Therefore, the execution time of the original program was 7.9 + 1 = 8.9 seconds. It would be better to remove the integer divide instruction enhancement.

[Hide Answer](#)

You have used 2 of 2 submissions

[Show Discussion](#)[New Post](#)

edX offers interactive online classes and MOOCs from the world's best universities. Online courses from MITx, HarvardX, BerkeleyX, UTX and many other universities. Topics include biology, business, chemistry, computer science, economics, finance, electronics, engineering, food and nutrition, history, humanities, law, literature, math, medicine, music, philosophy, physics, science, statistics and more. EdX is a non-profit online initiative created by founding partners Harvard and MIT.

© 2015 edX Inc.

EdX, Open edX, and the edX and Open edX logos are registered trademarks or trademarks of edX Inc.

[Terms of Service and Honor Code](#)

[Privacy Policy \(Revised 10/22/2014\)](#)

POWERED BY
OPENedX

About edX

[About](#)

[News](#)

[Contact](#)

[FAQ](#)

[edX Blog](#)

[Donate to edX](#)

[Jobs at edX](#)


Follow Us


 [Facebook](#)


 [Twitter](#)


 [LinkedIn](#)

 [Google+](#)

 [Tumblr](#)

 [Meetup](#)

 [Reddit](#)

 [Youtube](#)