

## Quiz - Block and Hierarchy Diagrams

Reminder: if you have questions about anything on the quiz, try not to spoil any answers for others who haven't yet taken the quiz.

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✗ Why do we need both block diagrams and hierarchy of control?

- ☐ Block diagrams tell you what happens; HoC tells you how it happens.
- ☐ Block diagrams tell you where the code lives; HoC tells you how big it is.
- ☒ Block diagrams list the resources you have; HoC identify shared resources ✓
- ☐ Block diagrams show hardware resources; HoC use the resources to accomplish product goals
- ☒ Block diagrams indicate the complexity of the system; HoC indicates where it can be simplified. ✗

Correct answer

- ☒ Block diagrams tell you what happens; HoC tells you how it happens.
- ☒ Block diagrams list the resources you have; HoC identify shared resources
- ☒ Block diagrams show hardware resources; HoC use the resources to accomplish product goals

Feedback

*Block diagrams tell you what happens and what resources you have. HoC diagrams identify shared resources and how resources are used.*



✗ Which of these statements about the diagrams are true?

- ☒ The software block diagram is useful for considering the complexity of the software which may have an impact on processor selection. ✓
- ☒ The hierarchy of control diagram is useful in isolating bugs in shared resources. ✓
- ☒ A block diagram is useful in verifying you have a reasonably modular system, allowing for the replacement of peripheral hardware as needed. ✓
- ☐ A hierarchy of control diagram helps ensure modules aren't sharing information that should be hidden.
- ☒ Block diagrams and hierarchy of control diagrams are useful in figuring out how the system does (or should) work by breaking it into independent subsystems. ✓

Correct answer

- ☒ The software block diagram is useful for considering the complexity of the software which may have an impact on processor selection.
- ☒ The hierarchy of control diagram is useful in isolating bugs in shared resources.
- ☒ A block diagram is useful in verifying you have a reasonably modular system, allowing for the replacement of peripheral hardware as needed.
- ☒ A hierarchy of control diagram helps ensure modules aren't sharing information that should be hidden.
- ☒ Block diagrams and hierarchy of control diagrams are useful in figuring out how the system does (or should) work by breaking it into independent subsystems.



✓ If I added a camera for taking pictures to the Cheerson CX-10, where would it go in the software block diagram?

☒ Camera would be outside the processor box, the communication driver on the inside of the processor box with then the camera driver box next to that. ✓

☐ Camera would be on the inside, next to the motor control.

☐ Camera would be attached to the serial debug section so any subsystem can use it.

☐ Camera would go near the motors, outside the processor box, with a line drawn to the system control.

☐ Camera would be under user commands because a user command that came in via radio would cause a picture to be taken.

#### Feedback

*The camera would be outside the processor box to show it is not part of the processor. Like the inertial and radio peripherals, the processor would have a communication driver and a camera driver indicating blocks of software running on the processor.*



✗ If you added a camera for taking pictures to the Cheerson CX-10 and modified the hierarchy of control, which of these potential problems might become apparent?

- ☐ The diagram would become overly complicated and probably needs to be redrawn.
- ☒ The user commands would have to go to the camera box to indicate the radio might send a command to take pictures. ✗
- ☒ If the camera uses I2C or SPI to send data, we might have to share resources, which might cause conflicts. ✓
- ☒ There is no place for the camera data to go once a picture has been taken so we are missing a whole subsystem. ✓
- ☐ The camera probably needs access to the motor control output.

#### Correct answer

- ☒ If the camera uses I2C or SPI to send data, we might have to share resources, which might cause conflicts.
- ☒ There is no place for the camera data to go once a picture has been taken so we are missing a whole subsystem.

#### Feedback

*If the camera shares a resource that is used by another peripheral, conflicts can be identified early in the project and planned for. While the radio and inertial data feed into system control, the camera doesn't do anything, indicating the design isn't complete.*

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