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Rename the completed Word document to *yourlastname\_Q3.docx* before emailing it to [tlupfer@sandiego.edu](mailto:tlupfer@sandiego.edu). In other words, my quiz would be named *lupfer\_Q3.docx*.

This is a closed-book, off-grid (no Internet searches) quiz. You have 10 minutes to complete it.

**Reminder**: USD Honor Code: [www.sandiego.edu/conduct/documents/HonorCode.pdf](http://www.sandiego.edu/conduct/documents/HonorCode.pdf)

**All questions are worth 10 points (11 x 10 = 110 points total)**

What does HAL stand for?

1. **Answer**: Hardware Abstraction Layer

What is a HAL and who is usually responsible for creating the HAL?

1. **Answer**: The HAL is a feature that allows hardware to be interacted with at the kernel or driver level rather than at the hardware level, so that use of the hardware can be much easier. As such, the developers of an RTOS are usually responsible for creating since it is a convenience feature for those who might develop on a board running that RTOS.

What does BSP stand for?

1. **Answer**: Board Support Package

What is a BSP and who is usually responsible for creating the BSP?

1. **Answer**: A BSP is a set of drivers and the like for a set of hardware specific to a board, allowing certain features to be used on it without being made by users. As such, a BSP is generally made by the maker of the board since they would want its users to have that hardware support and ease-of-use/development.

What are the names of the three segments the IDE lists with their sizes after a successful build?

1. **Answer**: Test, Data, BSS

Which segment contains the CPU instructions?

1. **Answer**: Text

Where is the segment containing the CPU instructions stored on an MCU (flash or RAM)?

1. **Answer**: Flash

Which segment contains the non-zero initialized static and global variables?

1. **Answer**: Data

Where is the segment containing the non-zero initialized static and global variables stored on an MCU (flash or RAM)?

1. **Answer**: RAM

Which segment contains the zero initialized and the uninitialized static and global variables?

1. **Answer**: BSS

[BONUS] Why do we care that the IDE reports the sizes of these three segments?

1. **Answer**: The IDE is showing these statistics so that developers might use them as benchmarks to make sure that they don’t inflate too much or push the boundaries of the SOC’s memory, as well as helping optimize when trying to reduce these utilizations.