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Rename the completed Word document to *yourlastname\_Q4.docx* before emailing it to [tlupfer@sandiego.edu](mailto:tlupfer@sandiego.edu). In other words, my quiz would be named *lupfer\_Q4.docx*.

This is a closed-book, off-grid (no Internet searches) quiz. You have 15 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 (10 x 10 = 100 points total)**

Describe the functionality a semaphore provides.

1. **Answer**: A semaphore tracks tasks that want processing resources.

What is the first thing you must do if you intend to use a semaphore?

1. **Answer**: If you intend to use a semaphore the first thing you must do is initialize and create it using xSemaphoreCreateBinary()

When a task wants to signal another task or ISR of an event, what do we say it does with the semaphore?

1. **Answer**: When a task wants to signal another or create an ISR, it is going to “give” the semaphore in order to essentially queue that item for processing

When a task wants to determine if an event has occurred via a semaphore, what do we say it does with the semaphore?

1. **Answer**: When a task wants to determine if an event has occurred via semaphore, we say it is wanting to “take” the semaphore should one be available to take

Describe the purpose of the two arguments of the FreeRTOS semaphore function used to determine if an event has occurred.

1. (SemaphoreHandle\_t) **Answer**: This is used on initialization/creation of the semaphore.
2. (xTicksToWait) **Answer**: This sets how many ticks between each check for whether a semaphore and thereby a process is available

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 chipmaker is usually the on creating the HAL, since the chip itself and interaction with it is desirable to be abstracted and as “plug-and-play” as possible for companies wanting to use that chipset

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**: The maker of the board are usually responsible for the creation of the BSP, since the BSP is meant to handle interactions with all peripherals on the board itself that might be outside of the scope of solely the chipset (sensors, ports, displays, speakers, etc)