Basic Computer Animation Using µC/OS-II

Objective: The objective of this lab is to become familiar with the VGA port on the DE2-115 Computer by implementing a moving box in µC/OS-II. Multiple periodic tasks will be created for the animation and I/O control. Semaphore, event flag, and mailbox (or message queue) should be used for inter-task communication and synchronization.

Procedure:
This section describes the specific steps you are to take in carrying out this lab.

Part I:
1. Write a C program to implement the following functions.
   - Create a box that is 20×20 pixels at the centre of the screen.
   - The box can be moved up, down, left and right by pressing KEY2, KEY1, KEY3 and KEY0, respectively.
   - The box can be moved beyond the screen boundary.
2. Compress your source code into one zip file named <nsid>_vga_part1.zip. Hand in the zip file to the "vga_lab" hand-in folder through Black Board course tools.

Part II:
1. Write a C program to implement the following functions.
   - Create a box that is 20×20 pixels at the centre of the screen.
   - When KEY2 is pressed, the box moves up/down automatically and bounces off the screen boundary.
   - When KEY1 is pressed, the box moves left/right automatically and bounces off the screen boundary.
   - Pressing KEY0 to stop the box.
2. Compress your source code into one zip file named <nsid>_vga_part2.zip. Hand in the zip file to the "vga_lab" hand-in folder through Black Board course tools.

Part III:
1. Implement Part II using µC/OS-II.
   - Create at least one periodic task for the moving box.
   - Create at least one periodic task for handling KEY pressing.
   - Use semaphore(s), mailbox(es) and/or event flag(s) for inter-task communication and synchronization.
2. Compress your source code into one zip file named <nsid>_vga_part3.zip. Hand in the zip file to the "vga_lab" hand-in folder through Black Board course tools.

(Optional) Part IV:
1. Implement Part III by using the up, down, left and right arrow keys on the keyboard. NOTE: You can use the keyboard attached to the computer or attach a PS/2 keyboard to read the keyboard input.
2. Compress your source code (including test programs) into one zip file named <nsid>_vga_part4.zip. Hand in the zip file to the "vga_lab" hand-in folder through Black Board course tools.