

Question 1: Briefly explain how the firmware in the pacman-qemu.zip works.

The t.c file has the code that controls most of the game logic such as displaying Pacman and the ghosts within the frame buffer and it controls how the game behaves. As the ghosts also need to be able to move with Pacman in the frame buffer we can't have a busy-wait as this means we can't have simultaneous inputs and outputs. We can replace the busy-wait with interrupts which allow it to change what is in control of the CPU such as upeek method in the uart.c file.

The uart.c file is the driver for the UART and it has a register on the UART peripheral. The registers knows when something is picked up and the uart_handler method is called when the uart peripheral says there is a character available. Then the upeek method tells us what character is in the buffer and takes it. Then in t.c we get what character was entered and change pacmans position depending on the input. The ghosts movement is controlled with a timer which is controlled by spriteMove that has a timer interrupt which has an interrupt controlled by timer.c.

The djikstra.c file contains the shortest path algorithm needed by the ghosts to follow pacman.

The vid.c file controls the methods which draw pacman and the ghosts into the frame buffer.

All the images are stored as .bmp files and are converted into .o files so that they can be called and drawn by vid.c