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Week 8 Studio 1

Group 4b

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Question 1:

The outputs are some symbols instead of the x and y value we input. “char theSize = (char) sizeof(TData)” causes Serial Monitor to print the serialised version of TData data structure.

Question 2:

The values of x and y received by Pi are not correct. Size of TData on the Pi is 8 bytes while size of TData on the Arduino is 4 bytes. Pi should receive a x-value of 5 first then the x-value will increase by 1 continuously, and a y-value remains constant at 10. But instead, Pi receives a x-value of 655365 and the x-value increases by 1 continuously and a y-value remains constant at 2130612756.

Question 3:

The values of x and received by Pi are correct now after changing “int” to “int32\_t”. Size of TData on the Pi and Arduino are both 8 bytes now. This is because “int” in Arduino is interpreted as a 16-bit data while “int” in Pi is interpreted as a 32-bit data. So if “int” is used instead of “int32\_t”, there is a difference on data size, leading to an error in packet format.

Question 4:

Size of TData on the Pi is 12 bytes and size of TData on the Arduino is 9 bytes.

There is a difference in size of TData on the Pi and on the Arduino and this difference affects the answers for x and y. Now Pi receives a x-value of 2560 and the x-value increases by 1 continuously, and a y-value remains constant at 2122330624, and the c-value increases from “a” alphabetically.

Question 5:

Size of TData on the Pi and Arduino are both 12 bytes now.

The x, y and c fields are printed correctly now. This is because the gcc compiler has a padding of 3 bytes after char “c” while the compiler on the Arduino does not. Pi expects each char to be a 4-byte storage while Arduino expects each char to be a 1-byte storage. Thus, without “char dummy[3]”, there is a difference in data size, leading to an error in packet format.