13 Combining Buttons and LEDs

Activity: Work the following exercises as directed by your tutor:

Purpose of this Activity

To learn about input (sensing) and output (indicating) interfaces of microprocessor systems.

Learning Outcome

- To be able to combine input and output signals of a microprocessor.
- To be able to write, compile and test C code from given specifications.

Task 1

Write C-code on the Raspberry Pi that combines input and output channels in the following way:

- Create a new C-code file with your name and task number and no spaces, for example, *JSmith13.c* .
- Write a comment block that contains your name and date and a brief (1-2 sentences) description of what the program will do.

We will use I/O ports B1, B2, B3 to read the three pushbutton states.

We will use I/O ports B9, B10, B11 as output display on the LEDs.

Write a main() function with the following sequences. Write the sequence with comments first before implementing the code itself.

a) At startup, the program should inform the user how to correctly wire up the Gertboard. Pay attention to wire and jumper connections. You may refer to the attached junction/port layout diagram.

b) The program should then initialise the ports correctly.
   Refer to previous C-code programs (e.g. leds.c) for the two stages required.

c) Read and display the input state on B1. (Add B2, B3 later).

d) Use an infinite `do…while` loop (for now). In this loop, continuously monitor and print the button states of B1, B2, and B3.

Compile your code. Then link it into an executable. Ensure that you don't get any errors during the compilation and linking. Ask the lecturer if you need help.

Compile: Either in Geany or on the LXTerminal command line

```
gcc -c JSmith13.c
```

Link: On the LXTerminal command line

```
gcc -o myApp  JSmith13.o  gb_common.o
```

Execute: On the LXTerminal command line

```
sudo ./myApp
```

Implement further tasks as directed by your tutor.

Figure 1: Connectivity on the Gertboard. Ensure that wires (1) and jumpers (2) are in the correct places. Also place a jumper on the 3.3V connection labelled 3V3 in the figure.