



Task 6: Polling and Interrupt Modes of Work with Raspberry Pi Pico in Arduino IDE

Implement a given project: at first, in the polling mode, then in the interrupt mode

Individual variant: given project and peripherals chosen based on the number of student

Subtasks:

- 1) Implement a given project in the polling mode of work with peripheral devices
- 2) Implement the same project in the interrupt mode of work with peripheral devices

Optional study: how to work with multilayer interrupts – an interrupt while processing other interrupt

Directions:

- Use sensors and actuators, specified in the task variant, to imitate actual equipment
- Use realistic delays when switching states and providing output
- Use different actuators to reflect state and output
- Provide the following info:
 - Verbal description
 - Component list
 - Electric circuit layout
 - Hardware connection
 - Arduino sketches (polling and interrupt)
 - Screen images of compilation and uploading process
 - Scheme explaining ES work
 - Photo of connected hardware
 - Video of ES functioning with the author's interview

Excellence extensions: add motors to imitate movements within a given ES; add buzzer to imitate sounds

References: Lectures on IES

Supplemental materials: Freenove Tutorial for RP Pico with Arduino IDE

Task variants:

Student number	1-5	6-10
Task	Lift control in 3 storey building (*)	Vending machine (**)

(*) A simple lift in three storey building (as studied at lecture 2, 4 and implemented at practical work in Verilog and Task 3). Set of peripherals according to the table, chosen on the student number i.

(**) A simple vending machine for one type of coin and two types of goods (as studied at lecture 2, 4 and implemented at practical work in Verilog and Task 3). Set of peripherals according to the table, chosen on the student number i.

Table for peripheral choice

<i>Student Number</i>	1	2	3	4	5	6	7	8	9	10
<i>Peripheral Number</i>	1,3,5	2,3,5	1,4,5	2,4,6	1,3,6	2,3,6	1,4,5	2,4,6	1,3,6	2,4,5

Format – (x,q,y): input device, device to display state, device to display output.

Table of peripheral numbers

<i>Peripheral Number</i>	<i>Peripheral Name</i>
1	Matrix Keypad
2	Infrared Remote
3	Display Screen
4	7-segment display
5	LED bar
6	LEDs

Remark: for interrupt mode, it is allowed to use a required number of buttons instead of specified input device.

