YOBP

NÁSTROJ KE ZPRACOVÁNÍ ETAPOVÉHO MĚŘENÍ NIVELAČNÍHO PŘÍSTROJE

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Motivace

➢ Zobrazení výsledků etapového měření

➢ Ukládání dat do databáze typu sqlite3

➢ Ukázka posunů v rámci etap, ukázka grafu, export databáze do formátu csv

SOFTWARE

- ➢ Programovací jazyk: Python
- ➢ Vývojové prostředí: PyCharm
- ➢ Plug – in Pythonu pro vývoj GUI: PyQt
- ➢ Pomocná databáze: sqlite

GRAFICKÝ NÁVRH DATABÁZE

Time series of levelling measurements (Trimble DINI // Leica LS15 & LS10)

DB name: Levelling.db --sqlite3

	Timestamp	68-1	69-2	71-1	71-2	B01	B02	B03	B04	B05	B06	B07	B08	F4	F5
1	2023-01-15 14:41:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2023-01-15 14:41:30	N	N	N	N	0.08	-0.07	-0.69	-2.22	-2.82	-1.23	-0.93	0.23	0.15	N
3	2023-01-15 14:41:39	N	N	N	N	0.04	-0.27	-0.85	-2.33	-2.92	-1.62	-1.04	0.00	-0.04	0.07

Add data   Delete data   Graph   Export

```python
class Window(QtWidgets.QMainWindow):
    def __init__(self):
        super(Window, self).__init__()
        self.ui = Ui_MainWindow()
        self.ui.setupUi(self)
        self.showDB()

        self.connection = sqlite3.connect("Levelling.db")
        self.cursor = self.connection.cursor()

        self.ui.add_button.clicked.connect(self.btnAddMeas)
        self.ui.delete_button.clicked.connect(self.btnDeleteMeas)
        self.ui.exp.clicked.connect(self.btnExportMeas)
        self.ui.graph_button.clicked.connect(self.btnGraphMeas)
```

```python
class Ui_MainWindow(object):
    def setupUi(self, MainWindow):
        MainWindow.setObjectName("MainWindow")
        MainWindow.showMaximized()
        MainWindow.setWindowIcon(QIcon('img/icon.png'))
        MainWindow.setWindowTitle('Time series of levelling measurements
(Trimble DINI // Leica LS15 & LS10)')
```

GRAFICKÝ
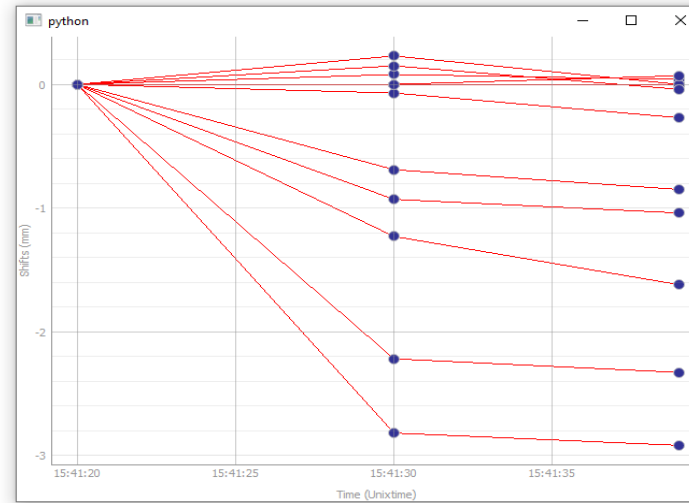NÁVRH
DATABÁZE

```
For M5|Adr     1|TO   ko220304.dat          |                |                    |
For M5|Adr     2|TO   Pocatek poradu    ZV  KO1|             |                    |
For M5|Adr     3|KD1       F2            KO1|                |Z      10.00000 m  |
For M5|Adr     4|KD1       F2      15.0 C  2 KO1|Rb   0.93835 m  |HD   21.640 m  |                    |
For M5|Adr     5|TO   Vlozene zamery        KO1|             |                    |
For M5|Adr     6|KD1       F4      15.0 C  2 KO1|Rz   0.65874 m  |HD   10.400 m  |Z      10.27961 m  |
For M5|Adr     7|TO   Konec vlozenych zamer  KO1|            |                    |
For M5|Adr     8|KD1       PR1     14.0 C  3 KO1|Rf   2.92080 m  |HD   20.359 m  |                    |
For M5|Adr     9|KD1       PR1     14.0 C    KO1|             |                |Z       8.01755 m  |
For M5|Adr    10|KD1       PR1     13.0 C  3 KO1|Rb   0.19645 m  |HD   13.223 m  |                    |
For M5|Adr    11|TO   Vlozene zamery        KO1|             |                    |
For M5|Adr    12|KD1       B01     13.0 C  3 KO1|Rz   0.23354 m  |HD   12.108 m  |Z       7.98046 m  |
For M5|Adr    13|KD1       B02     13.0 C  2 KO1|Rz   1.47671 m  |HD    1.657 m  |Z       6.73729 m  |
For M5|Adr    14|KD1       B03     13.0 C  2 KO1|Rz   1.62390 m  |HD    2.460 m  |Z       6.59010 m  |
For M5|Adr    15|KD1       B04     13.0 C  2 KO1|Rz   2.40871 m  |HD    9.583 m  |Z       5.80529 m  |
For M5|Adr    16|KD1       B05     13.0 C  2 KO1|Rz   2.55676 m  |HD   11.333 m  |Z       5.65724 m  |
For M5|Adr    17|TO   Konec vlozenych zamer  KO1|            |                    |
For M5|Adr    18|KD1       PR2     12.0 C  2 KO1|Rf   2.55669 m  |HD   11.333 m  |                    |
For M5|Adr    19|KD1       PR2     12.0 C    KO1|             |                |Z       5.65731 m  |
For M5|Adr    20|KD1       PR2     12.0 C  2 KO1|Rb   0.59851 m  |HD    7.378 m  |                    |
For M5|Adr    21|TO   Vlozene zamery        KO1|             |                    |
For M5|Adr    22|KD1       B06     11.0 C  2 KO1|Rz   1.15696 m  |HD    2.729 m  |Z       5.09886 m  |
For M5|Adr    23|KD1       B07     11.0 C  2 KO1|Rz   1.28166 m  |HD    2.106 m  |Z       4.97416 m  |
For M5|Adr    24|KD1       B08     11.0 C  2 KO1|Rz   2.64949 m  |HD   11.592 m  |Z       3.60633 m  |
For M5|Adr    25|TO   Konec vlozenych zamer  KO1|            |                    |
For M5|Adr    26|KD1       PR3     11.0 C  2 KO1|Rf   0.59856 m  |HD    7.379 m  |                    |
For M5|Adr    27|KD1       PR3     11.0 C    KO1|             |                |Z       5.65726 m  |
For M5|Adr    28|KD1       PR3     11.0 C  2 KO1|Rb   2.61923 m  |HD   11.670 m  |                    |
For M5|Adr    29|KD1       PR4     11.0 C  2 KO1|Rf   0.25908 m  |HD   12.917 m  |                    |
For M5|Adr    30|KD1       PR4     11.0 C    KO1|             |                |Z       8.01741 m  |
For M5|Adr    31|KD1       PR4     10.0 C  2 KO1|Rb   2.96736 m  |HD   20.141 m  |                    |
For M5|Adr    32|TO   Vlozene zamery        KO1|             |                    |
For M5|Adr    33|KD1       F4      10.0 C  2 KO1|Rz   0.70508 m  |HD   10.632 m  |Z      10.27969 m  |
For M5|Adr    34|TO   Konec vlozenych zamer  KO1|            |                    |
For M5|Adr    35|KD1       F2      10.0 C  2 KO1|Rf   0.98450 m  |HD   21.748 m  |                    |
For M5|Adr    36|KD1       F2      10.0 C    KO1|             |                |Z      10.00027 m  |
For M5|Adr    37|KD1       F2            KO1|Sh   0.00027 m  |dz   -0.00027 m  |Z      10.00000 m  |
For M5|Adr    38|KD2       F2         5    KO1|Db     74.05 m  |Df    73.74 m  |Z      10.00027 m  |
For M5|Adr    39|TO   Konec poradu          KO1|             |                    |
```

VSTUPNÍ SOUBOR – TRIMBLE DAT

STRUKTURA DATABÁZE

	id	timestamp	level	unixtimestamp
	Filtr	Filtr	Filtr	Filtr
1	F4	2023-01-15 14:41:20	10.27946	1673793680
2	69-2	2023-01-15 14:41:20	7.89205	1673793680
3	B01	2023-01-15 14:41:20	7.98038	1673793680
4	B02	2023-01-15 14:41:20	6.73736	1673793680
5	68-1	2023-01-15 14:41:20	6.59999	1673793680
6	B03	2023-01-15 14:41:20	6.59079	1673793680
7	B04	2023-01-15 14:41:20	5.80751	1673793680
8	B05	2023-01-15 14:41:20	5.66006	1673793680
9	B06	2023-01-15 14:41:20	5.10009	1673793680
10	71-2	2023-01-15 14:41:20	4.89348	1673793680
11	B07	2023-01-15 14:41:20	4.97509	1673793680
12	F5	2023-01-15 14:41:20	4.38197	1673793680
13	B08	2023-01-15 14:41:20	3.6061	1673793680
14	71-1	2023-01-15 14:41:20	3.49772	1673793680
15	F4	2023-01-15 14:41:30	10.27961	1673793690
16	B01	2023-01-15 14:41:30	7.98046	1673793690
17	B02	2023-01-15 14:41:30	6.73729	1673793690
18	B03	2023-01-15 14:41:30	6.5901	1673793690
19	B04	2023-01-15 14:41:30	5.80529	1673793690
20	B05	2023-01-15 14:41:30	5.65724	1673793690
21	B06	2023-01-15 14:41:30	5.09886	1673793690
22	B07	2023-01-15 14:41:30	4.97416	1673793690
23	B08	2023-01-15 14:41:30	3.60633	1673793690

GRAF

```python
class Graph(QtWidgets.QMainWindow):
    def __init__(self, connection, cursor):
        super().__init__()
        self.connection = connection
        self.cursor = cursor
        self.create_layouts()

    def create_layouts(self):
        self.main_layout = pg.PlotWidget(axisItems={'bottom': pg.DateAxisItem()})
        self.setCentralWidget(self.main_layout)
```

```python
        self.main_layout.setBackground('w')
        self.main_layout.setLabel('left', 'Shifts', units='mm')
        self.main_layout.setLabel('bottom', 'Time', units='Unixtime')
        self.main_layout.showGrid(x=True, y=True)
        self.main_layout.addLegend()
        pen = pg.mkPen(color=(255, 0, 0))

        #plot
        for i in range(0, len(data), len(unixtime)):
            dat = data[i:i+len(unixtime)]
            self.main_layout.plot(unixtime, dat, symbol='o', pen=pen)
            self.main_layout.show()
```

GRAF

EXPORT CSV

DĚKUJI ZA POZORNOST.