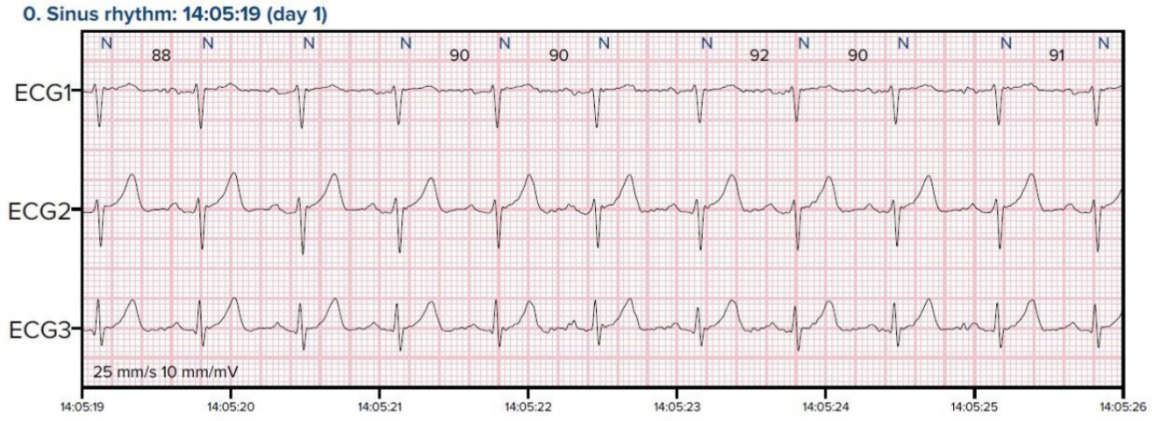
Informatyka Medyczna - Lab 1 - ECG analysis

Patryk Wojtyczek

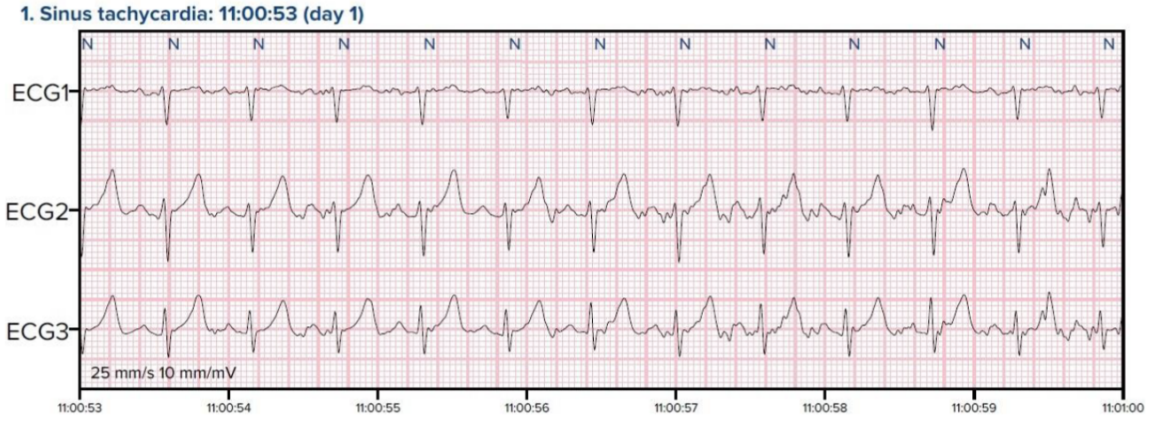
Zadanie 1 - Signal ECG1 - Patient 1

1. Using method 2 calculate missing values of heart rate



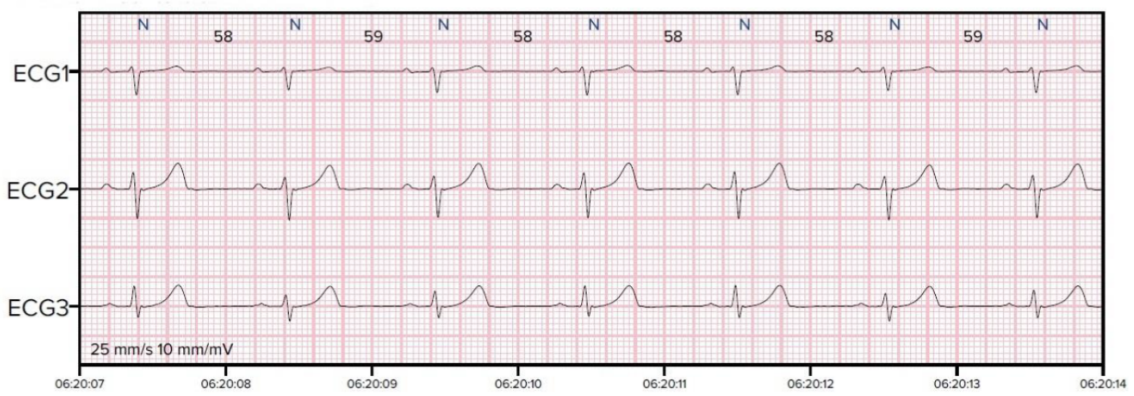
1st value: 1500/17=88
2nd value: 1500/16=93.75 No corresponding data on cardiomatics. But seems correct.

2. Calculate average heart rate for beats using method 1



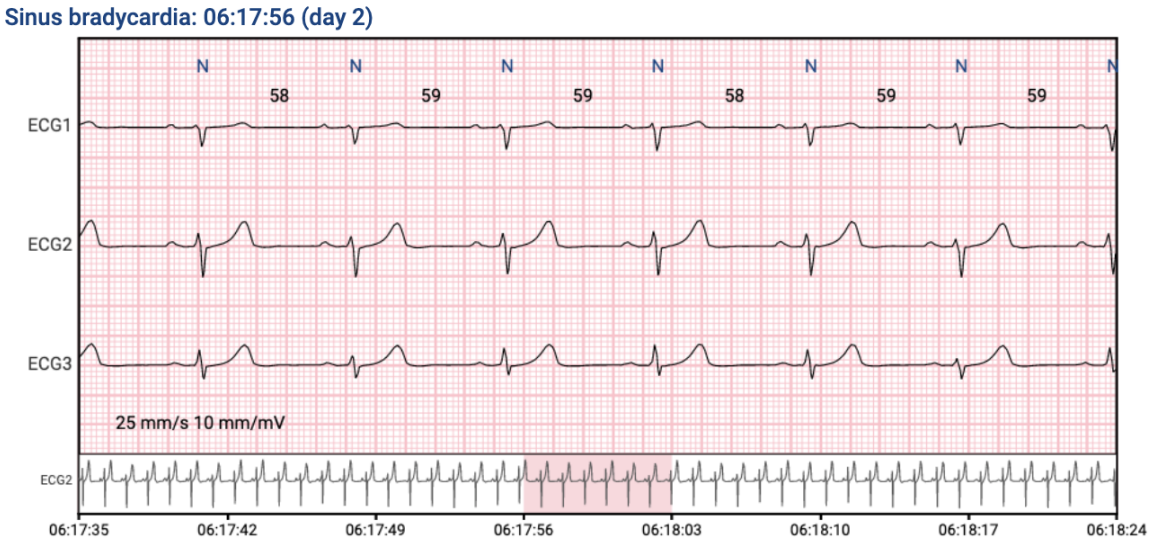
There seem to be 10 QRS complexes over the second interval (11:00:53-11:00:59), so the heart rate amounts to 10 * 10 = 100 beats/minute. No corresponding data on cardiomatics.

3. Name the rhythm (look at HR between consecutive normal beats)



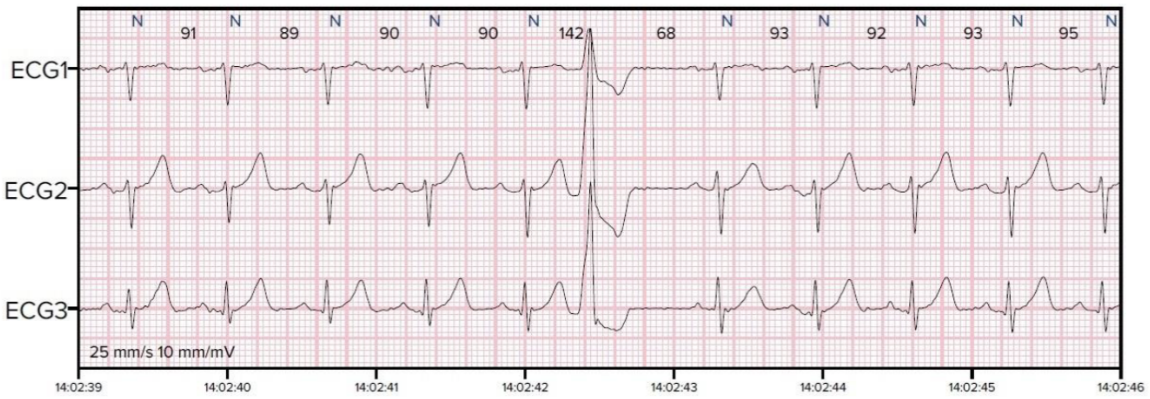
The rhythm is either “sinus” or “sinus bradycardia” becaue the typic HR for “sinus” is 60-100 and here we have something on the edge of lower limit.

The closest result from cardiomatics:



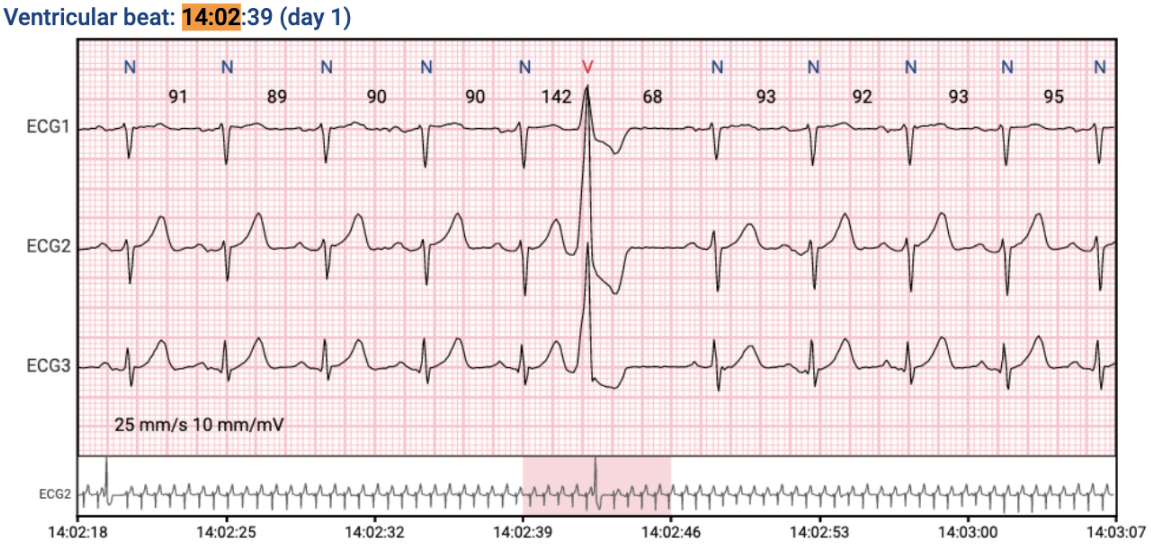
So it seems like it was “sinus”.

4. Name the beat which looks different than others



The beat that occurs between 14:02:42-14:02:43 differs from the others. It's called a "ventricular beat".

Results from cardiomatics:

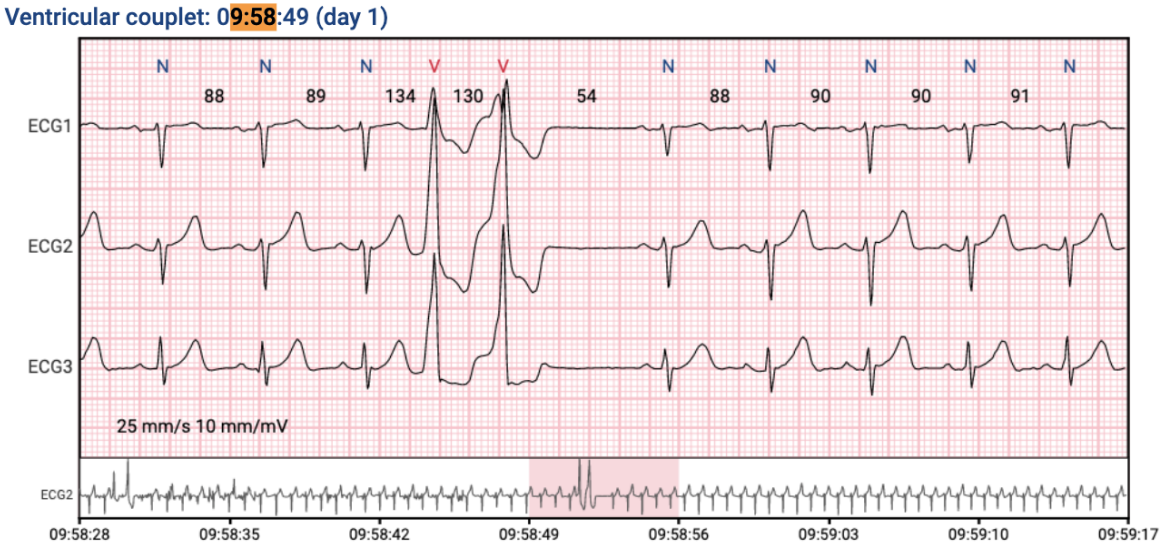


Cardiomatics agrees.

5. Recognize the rhythm

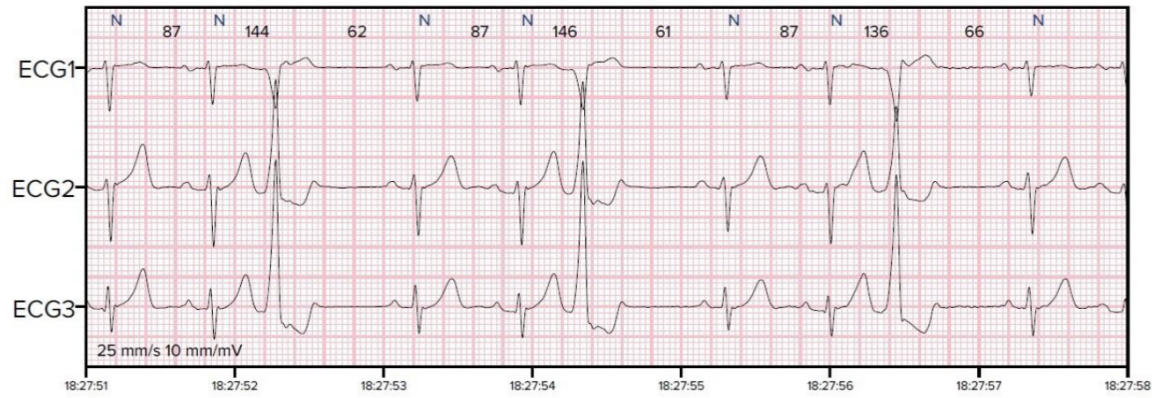
The rhythm seems to be “ventricular couplet”.

Results from cardiomatics:

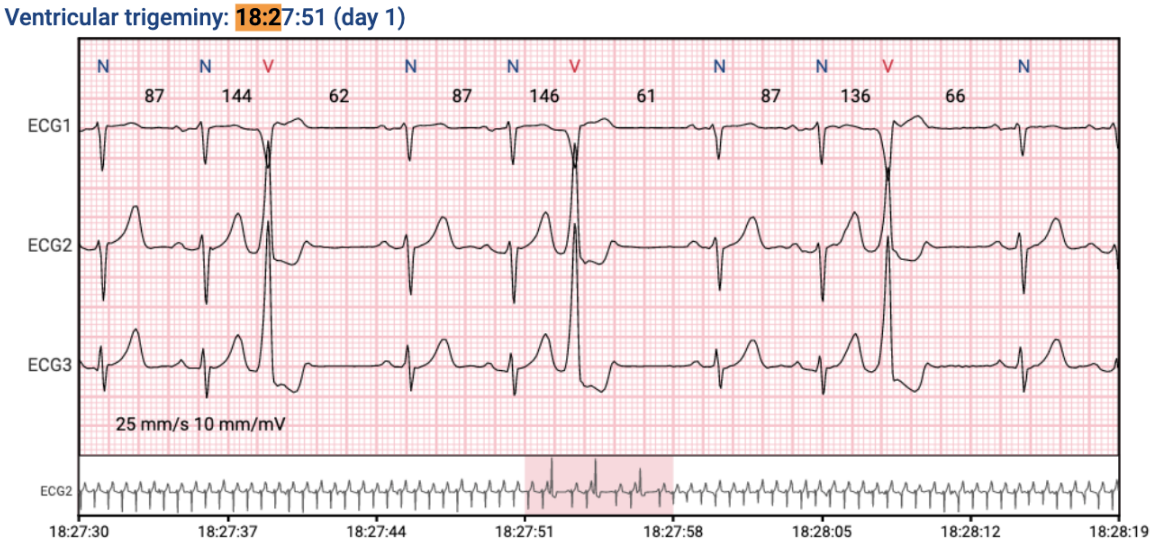


Correct.

6. Recognize the rhythm



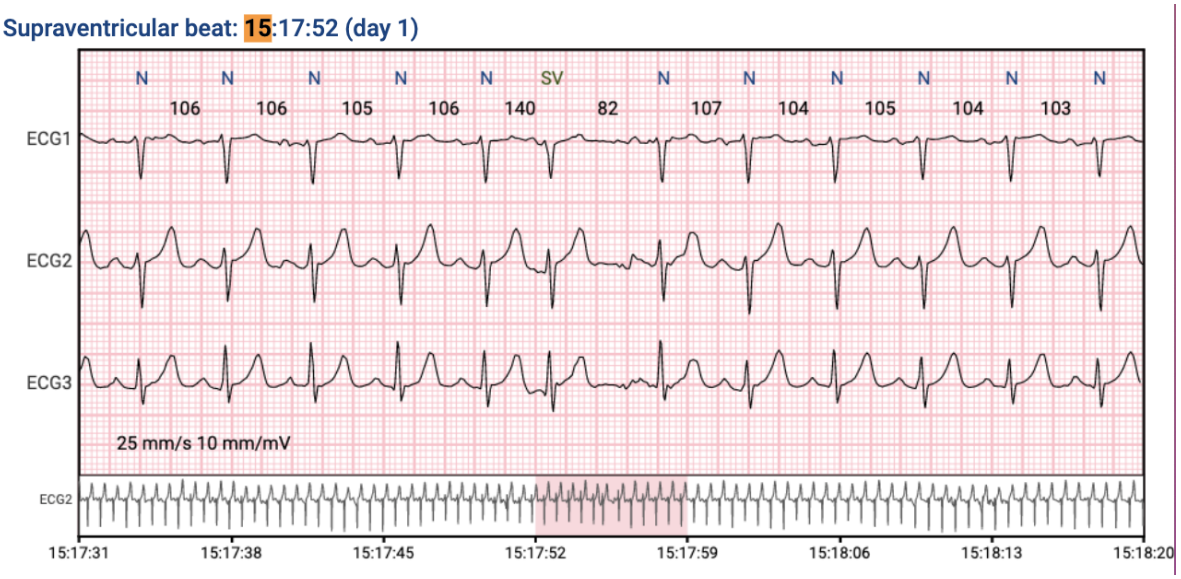
The rhythm seems to be “ventricular trigeminy”.



Correct.

6. Name the beat which looks different than others:

The beat is around 15:17:55 and it's called "supraventricular beat" - it occurs prematurely.
Results from cardiomatics:

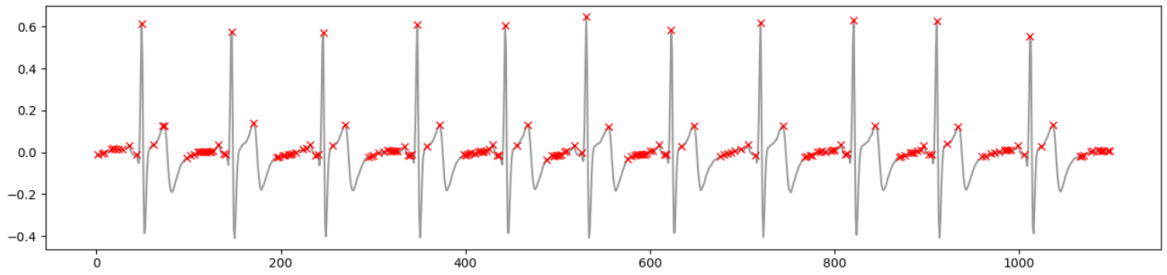


Correct.

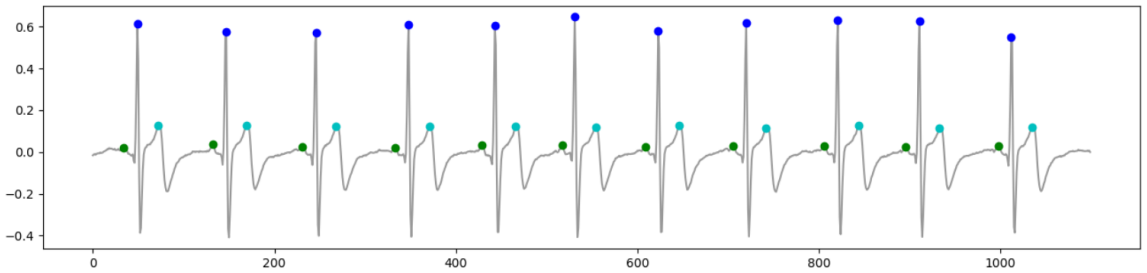
Zadanie 2

Zadanie 2a

Początkowy wykres.



Znaleziona wartość średniego rytmu to 62.3 bpm.
Wyznaczone punkty P, R i T.

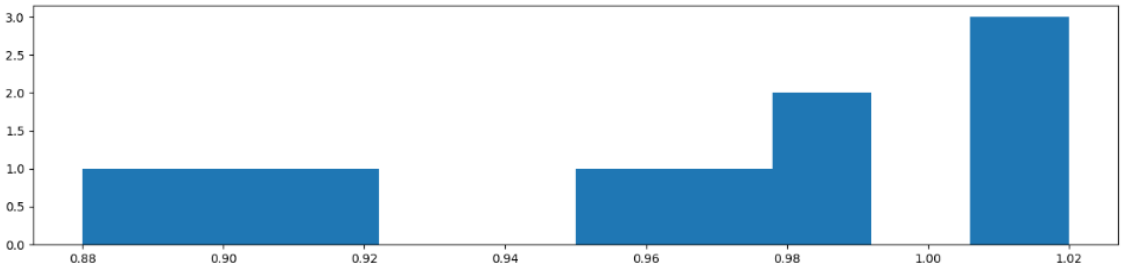


Indeksy wyróżnionych maksimów. Do ich wyznaczenia wykorzystałem okno o wielkości 5 - większe miały ten problem, że łączyły peak R z innymi.
filtered R peaks all:
[48 146 245 347 443 530 623 719 820 910 1012]

filtered P peaks all:
[34, 132, 231, 333, 429, 517, 609, 705, 806, 896, 998]

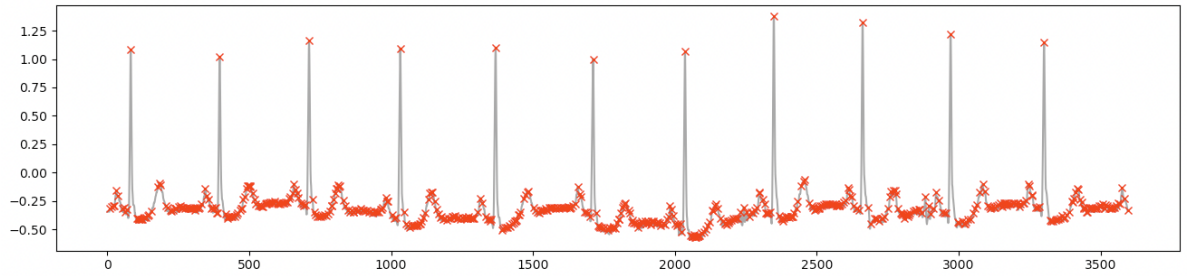
filtered T peaks all:
[72, 169, 268, 371, 466, 554, 646, 742, 844, 933, 1035]

Histogram interwałów RR:



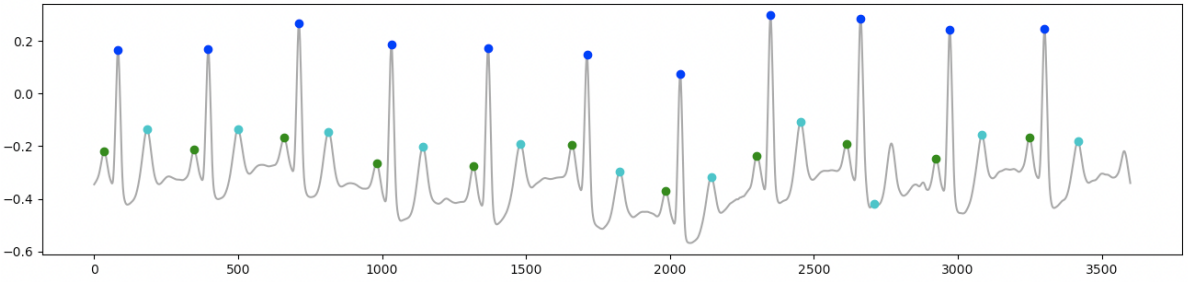
Zadanie 2b

Początkowy wykres - wykorzystalem pierwszą kolumnę P sygnału.



Znaleziona wartość średniego rytmu to 67.1 bpm.

Znalezienie właściwych maksimów było tutaj trudniejsze więc aby ułatwić sobie zadanie zastosowałem dwukrotny filtr o długości okna kolejno 5 i 15 co znacząco wygładziło dane jednocześnie zachowując istotne elementy.



filtered R peaks all:
[83 396 711 1032 1368 1712 2036 2349 2662 2972 3301]

filtered P peaks all:
[35, 347, 659, 981, 1317, 1660, 1985, 2302, 2613, 2924, 3249]

filtered T peaks all:
[184, 499, 814, 1142, 1481, 1826, 2143, 2454, 2709, 3083, 3417]