FS1 Algorithm

```
                         ┌─────────────┐
                         │    Start    │
                         └─────────────┘
                                │
                                ▼
                      ┌───────────────────┐
                      │ Declare variables │
                      └───────────────────┘
                                │
                                ▼
              ╱───────────────────╲          ╱────────────────────────╲
             ╱ Open file based on   ╲        ╱ Loop through the file to ╲
             ╲ user defined file name╱──────▶╲ determine the number of  ╱
              ╲───────────────────╱           ╲ points. Then rewind.   ╱
                                               ╲────────────────────╱
                                                         │
                                                         ▼
 ┌──────────────────┐      ╱──────────────────╲    ┌──────────────────────┐
 │ Filter the signal│     ╱ Read from the data ╲   │ Allocate memory for  │
 │ using 3-point    │◀───╲ file into the       ╱◀──│ arrays based on number│
 │ moving average   │     ╲ allocated array   ╱    │ of points in data file│
 └──────────────────┘      ╲─────────────────╱     └──────────────────────┘
          │
          ▼
 ┌──────────────────┐
 │ Compute the first│
 │ derivative of    │
 │ the signal       │
 └──────────────────┘
          │
          ▼
 ┌──────────────────┐
 │ Compute the      │
 │ second derivative│
 │ of the signal    │
 └──────────────────┘
          │
          ▼
 ┌──────────────────┐    ┌───────┐    ◇─────────────◇  Yes  ◇──────────────────◇
 │ Scale and sum the│───▶│ I = 0 │──▶ ◇I < length(   ◇─────▶◇ scaled sum('n')   ◇
 │ first and second │    └───────┘    ◇  signal)     ◇      ◇  >= 1.0           ◇
 │ derivatives      │                 ◇─────────────◇       ◇──────────────────◇
 └──────────────────┘                        │                      │
                                             │                     YES
                                             ▼                      ▼
                              ╱────────────────╲         ◇──────────────────◇
                             ╱ Write results to ╲        ◇ Are at least 6 of ◇
                             ╲ output file      ╱        ◇ the next 8 data    ◇
                              ╲────────────────╱         ◇ points > 1.0       ◇
                                      │                  ◇──────────────────◇
                                      ▼                          │
                           ┌────────────────┐                   YES
                           │ Calculate      │                    ▼
                           │ average heart  │         ┌──────────────────────┐
                           │ rate based on  │         │ Store the location    │
                           │ information    │         │ and amplitude in      │
                           │ gained thusfar │         │ memory                │
                           └────────────────┘         └──────────────────────┘
                                      │
                                      ▼
                           ╱────────────────╲
                          ╱ Plot data set in ╲
                          ╲ MatLab           ╱
                           ╲────────────────╱
                                      │
                                      ▼
                            ┌─────────────┐
                            │    Start    │
                            └─────────────┘
```

I++   NO