PART 1

Instructions for the student...

With fresh water supplies diminishing, the use of flow meters to regulate water consumption will become increasingly important. You are a new technician at a metal working shop which frequently uses fresh water to cool and lubricate several of their machines. In anticipation of upcoming mandatory regulation, you have proposed to your new bosses that the shop determine its current level of water usage. They like your idea so much that they have put you in charge of making this measurement.

In researching this question you quickly learn that flow meters *can* be very costly to design and build so that they will always give the exact same measurement; however, less expensive ones also exist. These cheaper models do not always give the exact same reading for consecutive measurements, only close to the same. This is okay because your particular application has more generous tolerances - you do not need to break the bank and get the very best device.

You have found four different models (Schwartz Water Flow Meter, MegaBonn 3000, Wiemanator Carlatron, and Jimmy Dees Flomometer), for the same lesser price, that all perform well-enough for your intended application. The manufacturers have each provided data (below) on the flow rate of water (in units of millilitres per second), as measured by their device and through the same standardized test equipment. But a picture is worth a thousand words, and you want to convert these data into a useful graph for easy comparison.

Specifically, you must invent a procedure for graphically representing the water flow data for each of the four devices. There is more than one way to do this, but you have to use the same procedure for each device, so that a fair comparison may be made between graphs. <u>Outline your procedure for converting the data provided below into a useful graphical representation, and show the resulting graph for each data set.</u>

Rules...

1. The exact same procedure must be used for each device in creating the graphical representation.

measurement #	Schw artz Water Flow Meter	MegaBonn 3000	Wiemanator Carlatron	Jimmy Dees Flomometer
1	10.03	9.77	11.15	9.91
2	9.73	9.72	11.52	9.88
3	10.06	10.30	10.68	10.00
4	9.93	10.15	10.76	9.97
5	10.26	10.05	11.05	10.43
6	10.16	10.23	11.19	9.41
7	9.99	9.99	10.96	10.57
8	9.50	9.98	11.18	9.22
9	10.13	10.25	11.32	10.26
10	9.61	9.90	11.03	9.05
11	-	10.51	-	-
12	-	9.84	-	-
13	-	10.18	-	-
14	-	9.85	-	-
15	-	9.81	-	-
16	-	10.07	-	-
17	-	9.45	-	-
18	-	10.08	-	-
19	-	9.93	-	-
20	-	9.65	-	-

PART 2
Instructions for the student...

Now that you have created a graphical representation of the water flow data, a decision needs to be made concerning which device to purchase. In the interest of being able to best recommend one of these devices over another to your bosses, you have decided to assign a "blue-ribbon factor" to each these four flow meters. This "blue-ribbon factor" will be a measure of how well the device measures the flow rate of water.

Specifically, you must invent a procedure for computing the "blue-ribbon factor" for each of the devices. There is no single way to do this, but you have to use the same procedure for each device, so that it is a fair comparison between the devices. Write your procedure and the "blue-ribbon factor" you compute for each device using the data provided above and/or the graphical representation provided below. From that, rank the performance of the devices in the order of best to worst.

Rules...

1. Use the data provided from Part 1 and/or their graphical representation in histogram form.
2. Each device always performs reproducibly, so a device only gets a single blue-ribbon factor.
3. The exact same procedure must be used for each device to determine its blue-ribbon factor.
4. A small blue-ribbon factor implies that the device performs more reliably.