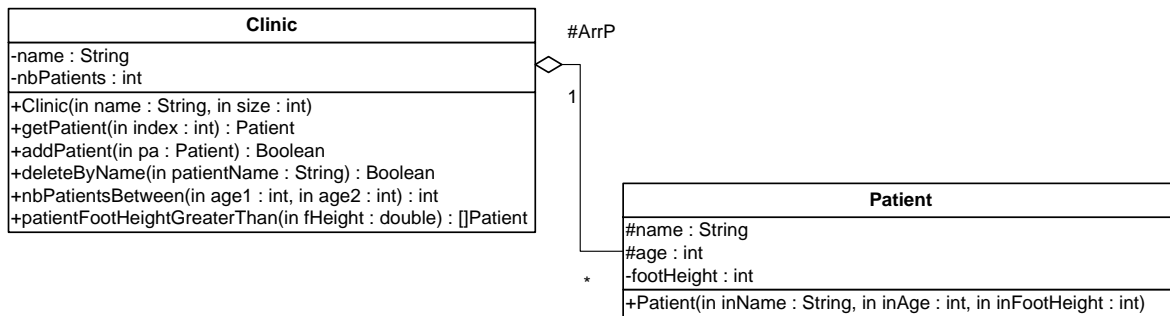


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**Question1:** We want to manage a clinic of patients. We consider the following UML diagram:



### Class Patient:

- ✓ **Patient** (*String na, int ag, double fh*)  
 Constructor with parameters initializing the attributes of the class.  
 Note that the attribute *foothHeight* is the length of the patient's foot.

### Class Clinic:

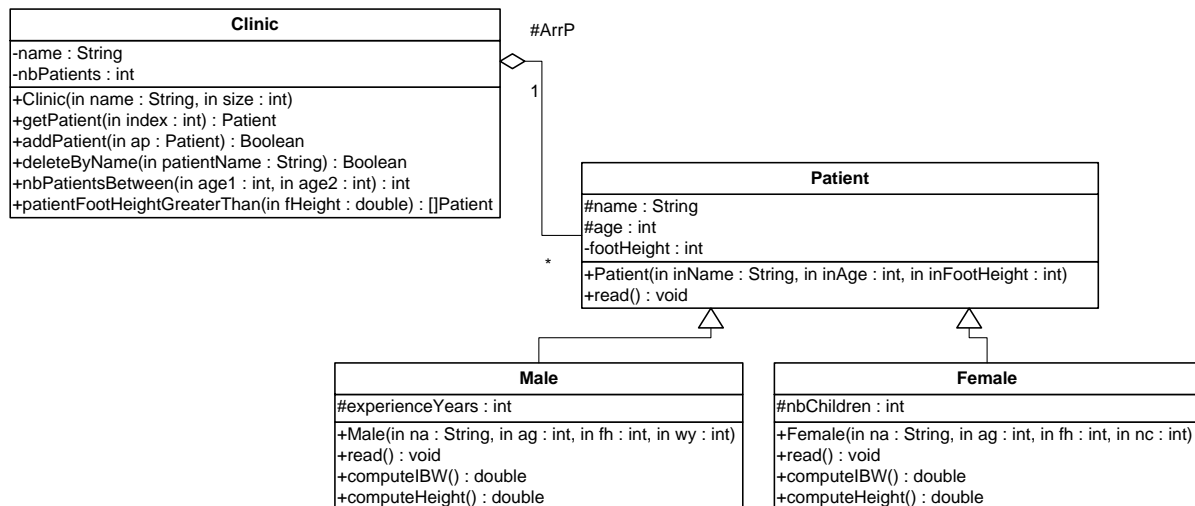
- ✓ **Clinic** (*String na, int size*)  
 Constructor with parameters creating the array of Patients.
- ✓ **getPatient** (*int index*): *Patient*  
 Receives the index and returns a patient at that index.
- ✓ **addPatient** (*Patient pa*): *Boolean*  
 Returns true if add it successful, false otherwise.
- ✓ **deletePatient** (*String patientName*): *Boolean*  
 Returns true if delete successful, false otherwise.
- ✓ **nbPatientsBetween** (*int age1, int age2*): *int*  
 Returns the number of Patients having *age* between *age1* and *age2*.
- ✓ **patientFootHeightGreaterThan** (*double fh*): *[] Patient*  
 Returns an array of Patients having *footHeight* greater than *fh*.

Write in Java the entire Clinic class and Patient class.

Note: You can call getters and setters without implementation.

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**Question2:** We now consider male and female patients and want to estimate the patient's ideal body weight depending on his/her foot height and age. Let's have the following UML diagram:



### Class Patient:

✓ *read()*

Reads the attributes of the class Patient using Scanner.

### Class Male:

✓ *Male( String na, int ag, double fh, int ey)*

Constructor with parameters initializing the attributes of the class.

✓ *read()*

Reads the attributes of the class Male using Scanner.

✓ *romputeHeight(): double*

Returns the height of the patient using the following formula:

$$\text{height} = 2.3 * \text{footHeight} - (10.063 * \text{age}) + 54.0$$

✓ *computeIBW()*

Returns the Ideal Body Weight of the patient using the following formula:

$$\text{IBW} = 51.7 + (1.9 * (\text{height} - 60.0)) \text{ where height is the height of the patient.}$$

Write in Java the entire Male class.

Note: You can call getters and setters without implementation.

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**Question3:** We now consider male and female patients and want to estimate the patient's ideal body weight depending on his/her foot height and age.

Write a main program that:

- a/ Creates a clinic called "ALSAHA" with a capacity of 100 patients.
- b/ Reads information of all the patients:
  - 30 Males using the method *read()* written in class Male.
  - 70 Females using the method *read()* written in class Female.
- c/ Displays the number of Females having more than 4 children.
- d/ Displays the name of all patients having *footHeight* greater than 40 using the method *PatientFootHeightGreaterThan()*.

Note: You can call getters and setters without implementation. Assume that the class Female is implemented.