

ALGORITHM
OF THE
STUDENT HEALTH TRACKER

Algorithm: Student Health Tracker System with Health Calculations

1. START

2. Define Structure for Student Health Record

Structure StudentHealth:

- roll_number (integer)
- name (string)
- age (integer)
- gender (char: M/F)
- height (float, in cm)
- weight (float, in kg)
- systolic_bp (integer)
- diastolic_bp (integer)
- heart_rate (integer)
- bmi (float)
- bmi_category (string)
- health_status (string)

3. Main Function

REPEAT

Display Menu:

1. Add Student Health Record
2. Display All Records
3. Search Student by Roll Number
4. Calculate and Update Health Metrics
5. Display Health Statistics
6. Check Health Alerts
7. Exit

Input choice

SWITCH (choice)

- CASE 1: Call AddStudentRecord()
- CASE 2: Call DisplayAllRecords()
- CASE 3: Call SearchStudent()
- CASE 4: Call UpdateHealthMetrics()
- CASE 5: Call DisplayStatistics()
- CASE 6: Call CheckHealthAlerts()
- CASE 7: EXIT
- DEFAULT: Display "Invalid Choice"

UNTIL choice == 7

4. Function: AddStudentRecord()

Input roll_number

// Check if student already exists

IF student exists THEN

Display "Student already registered"

RETURN

```

5. Function: CalculateBMI(weight, height)
   // BMI Formula: weight(kg) / (height(m))^2
   height_in_meters = height / 100.0
   bmi = weight / (height_in_meters * height_in_meters)
   RETURN bmi

6. Function: ClassifyBMI(bmi)
   IF bmi < 18.5 THEN
       RETURN "Underweight"
   ELSE IF bmi >= 18.5 AND bmi < 25.0 THEN
       RETURN "Normal weight"
   ELSE IF bmi >= 25.0 AND bmi < 30.0 THEN
       RETURN "Overweight"
   ELSE
       RETURN "Obese"

7. Function: CalculateBMR(weight, height, age, gender)
   // Basal Metabolic Rate (Harris-Benedict Equation)
   IF gender == 'M' THEN
       bmr = 88.362 + (13.397 * weight) + (4.799 * height) - (5.677 * age)
   ELSE
       bmr = 447.593 + (9.247 * weight) + (3.098 * height) - (4.330 * age)
   RETURN bmr

8. Function: ClassifyBloodPressure(systolic, diastolic)
   IF systolic < 120 AND diastolic < 80 THEN
       RETURN "Normal"
   ELSE IF systolic >= 120 AND systolic < 130 AND diastolic < 80 THEN
       RETURN "Elevated"
   ELSE IF systolic >= 130 AND systolic < 140 OR diastolic >= 80 AND diastolic <
90 THEN
       RETURN "Hypertension Stage 1"
   ELSE IF systolic >= 140 OR diastolic >= 90 THEN
       RETURN "Hypertension Stage 2"
   ELSE
       RETURN "Hypertensive Crisis"

9. Function: ClassifyHeartRate(heart_rate, age)
   // Normal resting heart rate: 60-100 bpm for adults
   IF age >= 18 THEN
       IF heart_rate < 60 THEN
           RETURN "Low (Bradycardia)"
       ELSE IF heart_rate >= 60 AND heart_rate <= 100 THEN
           RETURN "Normal"
       ELSE
           RETURN "High (Tachycardia)"
   ELSE
       // For children/teens, higher rates are normal
       IF heart_rate < 70 THEN
           RETURN "Low"

```

11. Function: DetermineHealthStatus(bmi, systolic_bp, diastolic_bp, heart_rate, age)

```
    health_score = 0

    // BMI check
    IF bmi >= 18.5 AND bmi < 25.0 THEN
        health_score = health_score + 25
    ELSE IF bmi >= 25.0 AND bmi < 30.0 THEN
        health_score = health_score + 15
    ELSE
        health_score = health_score + 5

    // Blood pressure check
    IF systolic_bp < 120 AND diastolic_bp < 80 THEN
        health_score = health_score + 25
    ELSE IF systolic_bp < 140 AND diastolic_bp < 90 THEN
        health_score = health_score + 15
    ELSE
        health_score = health_score + 5

    // Heart rate check
    heart_rate_status = ClassifyHeartRate(heart_rate, age)
    IF heart_rate_status == "Normal" THEN
        health_score = health_score + 25
    ELSE
        health_score = health_score + 10

    // Determine overall status
    IF health_score >= 70 THEN
        RETURN "Excellent Health"
    ELSE IF health_score >= 50 THEN
        RETURN "Good Health"
    ELSE IF health_score >= 30 THEN
        RETURN "Fair Health - Needs Attention"
    ELSE
        RETURN "Poor Health - Immediate Attention Required"
```

12. Function: SearchStudent()

Input roll_number

Search in records array/file

IF found THEN

Display complete health record:

- Personal details
- BMI and category
- Blood pressure status
- Heart rate status
- BMR (calculate)
- Ideal weight (calculate)

14. Function: DisplayStatistics()

Calculate and display:

- Total number of students
- Average BMI
- Percentage in each BMI category
- Students with normal BP vs high BP
- Average heart rate
- Overall health distribution

15. Function: CheckHealthAlerts()

FOR each student record DO

 alert_count = 0

 IF bmi < 18.5 OR bmi >= 30.0 THEN

 Display "Alert: Roll " + roll_number + " - BMI out of healthy range"

 alert_count++

 IF systolic_bp >= 140 OR diastolic_bp >= 90 THEN

 Display "Alert: Roll " + roll_number + " - High blood pressure"

 alert_count++

 IF heart_rate < 60 OR heart_rate > 100 THEN

 Display "Alert: Roll " + roll_number + " - Abnormal heart rate"

 alert_count++

END FOR

IF alert_count == 0 THEN

 Display "All students have normal health parameters"

16. Function: UpdateHealthMetrics()

Input roll_number

IF student not found THEN

 Display "Student not found"

 RETURN

Display current metrics

Input new values (height, weight, BP, heart rate)

Recalculate:

- BMI
- BMI category
- BP status
- Heart rate status
- Overall health status

Update record

Display updated information

THANKYOU  