

```

import static java.lang.Math.exp;
import static java.lang.Math.log;
import static java.lang.Math.pow;

/*
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 */
/**
 *
 * @author Nelson E
 */
public class lwdp {

    public static void main(String[] args) {

        static double cvd_female_raw(int age, int b_AF, int b_atypicalantipsy, int b_corticosteroids
, int b_migraine, int b_ra, int b_renal, int b_semi, int b_sle, int b_treatedhyp, int
b_type1, int b_type2, double bmi, int ethrisk, int fh_cvd, double rati, double sbp, double
sbps5, int smoke_cat, int surv, double town) {
    double survivor[] = {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0.988876402378082, 0, 0, 0, 0, 0};
    //[16]

    /* The conditional arrays */
    double Iethrisk[] = {0, 0, 0.2804031433299542500000000, 0.5629899414207539800000000,
0.2959000085111651600000000, 0.0727853798779825450000000, -0.1707213550885731700000000,
-0.3937104331487497100000000, -0.3263249528353027200000000, -0.1712705688324178400000000
};//[10]

    double Ismoke[] = {0, 0.1338683378654626200000000, 0.5620085801243853700000000,
0.6674959337750254700000000, 0.8494817764483084700000000};//[5]
    /* Applying the fractional polynomial transforms */
/* (which includes scaling) */
    double dage = age;
    dage = dage / 10;
    double age_1 = pow(dage, -2);
    double age_2 = dage;
    double dbmi = bmi;
    dbmi = dbmi / 10;
    double bmi_1 = pow(dbmi, -2);
    double bmi_2 = pow(dbmi, -2) * log(dbmi);

    /* Centring the continuous variables */
    age_1 = age_1 - 0.053274843841791;
    age_2 = age_2 - 4.332503318786621;
    bmi_1 = bmi_1 - 0.154946178197861;
    bmi_2 = bmi_2 - 0.144462317228317;
    rati = rati - 3.476326465606690;
    sbp = sbp - 123.130012512207030;
    sbps5 = sbps5 - 9.002537727355957;
    town = town - 0.392308831214905;

    /* Start of Sum */
    double a = 0;

    /* The conditional sums */
    a += Iethrisk[ethrisk];
    a += Ismoke[smoke_cat];

    /* Sum from continuous values */
    a += age_1 * -8.1388109247726188000000000;
    a += age_2 * 0.7973337668969909800000000;

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a += bmi_1 * 0.2923609227546005200000000;
a += bmi_2 * -4.1513300213837665000000000;
a += rati * 0.1533803582080255400000000;
a += sbp * 0.0131314884071034240000000;
a += sbps5 * 0.0078894541014586095000000;
a += town * 0.0772237905885901080000000;

/* Sum from boolean values */
a += b_AF * 1.5923354969269663000000000;
a += b_atypicalantipsy * 0.2523764207011555700000000;
a += b_corticosteroids * 0.5952072530460185100000000;
a += b_migraine * 0.3012672608703450000000000;
a += b_ra * 0.2136480343518194200000000;
a += b_renal * 0.6519456949384583300000000;
a += b_semi * 0.1255308058820178000000000;
a += b_sle * 0.7588093865426769300000000;
a += b_treatedhyp * 0.5093159368342300400000000;
a += b_type1 * 1.7267977510537347000000000;
a += b_type2 * 1.0688773244615468000000000;
a += fh_cvd * 0.4544531902089621300000000;

/* Sum from interaction terms */
a += age_1 * (smoke_cat = 1) * -4.7057161785851891000000000;
a += age_1 * (smoke_cat = 2) * -2.7430383403573337000000000;
a += age_1 * (smoke_cat = 3) * -0.8660808882939218200000000;
a += age_1 * (smoke_cat = 4) * 0.9024156236971064800000000;
a += age_1 * b_AF * 19.9380348895465610000000000;
a += age_1 * b_corticosteroids * -0.9840804523593628100000000;
a += age_1 * b_migraine * 1.7634979587872999000000000;
a += age_1 * b_renal * -3.5874047731694114000000000;
a += age_1 * b_sle * 19.6903037386382920000000000;
a += age_1 * b_treatedhyp * 11.8728097339218120000000000;
a += age_1 * b_type1 * -1.2444332714320747000000000;
a += age_1 * b_type2 * 6.8652342000009599000000000;
a += age_1 * bmi_1 * 23.8026234121417420000000000;
a += age_1 * bmi_2 * -71.1849476920870070000000000;
a += age_1 * fh_cvd * 0.9946780794043512700000000;
a += age_1 * sbp * 0.0341318423386154850000000;
a += age_1 * town * -1.0301180802035639000000000;
a += age_2 * (smoke_cat = 1) * -0.0755892446431930260000000;
a += age_2 * (smoke_cat = 2) * -0.1195119287486707400000000;
a += age_2 * (smoke_cat = 3) * -0.1036630639757192300000000;
a += age_2 * (smoke_cat = 4) * -0.1399185359171838900000000;
a += age_2 * b_AF * -0.0761826510111625050000000;
a += age_2 * b_corticosteroids * -0.1200536494674247200000000;
a += age_2 * b_migraine * -0.0655869178986998590000000;
a += age_2 * b_renal * -0.2268887308644250700000000;
a += age_2 * b_sle * 0.0773479496790162730000000;
a += age_2 * b_treatedhyp * 0.0009685782358817443600000;
a += age_2 * b_type1 * -0.2872406462448894900000000;
a += age_2 * b_type2 * -0.0971122525906954890000000;
a += age_2 * bmi_1 * 0.5236995893366442900000000;
a += age_2 * bmi_2 * 0.0457441901223237590000000;
a += age_2 * fh_cvd * -0.0768850516984230380000000;
a += age_2 * sbp * -0.0015082501423272358000000;
a += age_2 * town * -0.0315934146749623290000000;
/* Calculate the score itself */
double score = 100.0 * (1 - pow(survivor[surv], exp(a)));
return score;
}

static double cvd_male_raw(
    int age, int b_AF, int b_atypicalantipsy, int b_corticosteroids, int b_impotence2,
    int b_migraine, int b_ra, int b_renal, int b_semi, int b_sle, int b_treatedhyp, int
    b_type1, int b_type2, double bmi, int ethrisk, int fh_cvd, double rati, double sbp,
    double sbps5, int smoke_cat, int surv, double town

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) {
    double survivor[] = {0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0.977268040180206, 0, 0, 0, 0, 0};
    //[16]

    /* The conditional arrays */
    double Iethrisk[] = {0, 0, 0.27719248760308279000000000, 0.47446360714931268000000000,
    0.52961729919689371000000000, 0.03510015918629901700000000, -0.35807899669327919000000000,
    -0.40056485232165140000000000, -0.41522792889830173000000000, -0.26321348134749967000000000
    };//[10]
    double Ismoke[] = {0, 0.19128222863388983000000000, 0.55241588192645552000000000,
    0.63835053027506072000000000, 0.78983819881858019000000000};//[5]

    /* Applying the fractional polynomial transforms */
    /* (which includes scaling) */
    double dage = age;
    dage = dage / 10;
    double age_1 = pow(dage, -1);
    double age_2 = pow(dage, 3);
    double dbmi = bmi;
    dbmi = dbmi / 10;
    double bmi_2 = pow(dbmi, -2) * log(dbmi);
    double bmi_1 = pow(dbmi, -2);

    /* Centring the continuous variables */
    age_1 = age_1 - 0.234766781330109;
    age_2 = age_2 - 77.284080505371094;
    bmi_1 = bmi_1 - 0.149176135659218;
    bmi_2 = bmi_2 - 0.141913309693336;
    rati = rati - 4.300998687744141;
    sbp = sbp - 128.571578979492190;
    sbps5 = sbps5 - 8.756621360778809;
    town = town - 0.526304900646210;

    /* Start of Sum */
    double a = 0;

    /* The conditional sums */
    a += Iethrisk[ethrisk];
    a += Ismoke[smoke_cat];

    /* Sum from continuous values */
    a += age_1 * -17.83978166600557500000000000;
    a += age_2 * 0.00229648806057654920000000;
    a += bmi_1 * 2.45627766605363580000000000;
    a += bmi_2 * -8.30111223147113540000000000;
    a += rati * 0.17340196856327111000000000;
    a += sbp * 0.01291012654255330500000000;
    a += sbps5 * 0.01025191429129045600000000;
    a += town * 0.03326820127728729500000000;

    /* Sum from boolean values */
    a += b_AF * 0.88209236928054657000000000;
    a += b_atypicalantipsy * 0.13046879855173513000000000;
    a += b_corticosteroids * 0.45485399750445543000000000;
    a += b_impotence2 * 0.22251859086705383000000000;
    a += b_migraine * 0.25584178074159913000000000;
    a += b_ra * 0.20970658013956567000000000;
    a += b_renal * 0.71853261288274384000000000;
    a += b_semi * 0.12133039882047164000000000;
    a += b_sle * 0.44015721744575220000000000;
    a += b_treatedhyp * 0.51659871082695474000000000;
    a += b_type1 * 1.23434255216751750000000000;
    a += b_type2 * 0.85942071430932221000000000;
    a += fh_cvd * 0.54055469009390156000000000;

    /* Sum from interaction terms */

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a += age_1 * (smoke_cat = 1) * -0.2101113393351634600000000;
a += age_1 * (smoke_cat = 2) * 0.7526867644750319100000000;
a += age_1 * (smoke_cat = 3) * 0.9931588755640579100000000;
a += age_1 * (smoke_cat = 4) * 2.1331163414389076000000000;
a += age_1 * b_AF * 3.4896675530623207000000000;
a += age_1 * b_corticosteroids * 1.1708133653489108000000000;
a += age_1 * b_impotence2 * -1.5064009857454310000000000;
a += age_1 * b_migraine * 2.3491159871402441000000000;
a += age_1 * b_renal * -0.5065671632722369400000000;
a += age_1 * b_treatedhyp * 6.5114581098532671000000000;
a += age_1 * b_type1 * 5.3379864878006531000000000;
a += age_1 * b_type2 * 3.6461817406221311000000000;
a += age_1 * bmi_1 * 31.0049529560338860000000000;
a += age_1 * bmi_2 * -111.2915718439164300000000000;
a += age_1 * fh_cvd * 2.7808628508531887000000000;
a += age_1 * sbp * 0.0188585244698658530000000;
a += age_1 * town * -0.1007554870063731000000000;
a += age_2 * (smoke_cat = 1) * -0.0004985487027532612100000;
a += age_2 * (smoke_cat = 2) * -0.0007987563331738541400000;
a += age_2 * (smoke_cat = 3) * -0.0008370618426625129600000;
a += age_2 * (smoke_cat = 4) * -0.0007840031915563728900000;
a += age_2 * b_AF * -0.0003499560834063604900000;
a += age_2 * b_corticosteroids * -0.0002496045095297166000000;
a += age_2 * b_impotence2 * -0.0011058218441227373000000;
a += age_2 * b_migraine * 0.0001989644604147863100000;
a += age_2 * b_renal * -0.0018325930166498813000000;
a += age_2 * b_treatedhyp * 0.0006383805310416501300000;
a += age_2 * b_type1 * 0.0006409780808752897000000;
a += age_2 * b_type2 * -0.0002469569558886831500000;
a += age_2 * bmi_1 * 0.0050380102356322029000000;
a += age_2 * bmi_2 * -0.0130744830025243190000000;
a += age_2 * fh_cvd * -0.0002479180990739603700000;
a += age_2 * sbp * -0.0000127187419158845700000;
a += age_2 * town * -0.0000932996423232728880000;

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/* Calculate the score itself */

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double score = 100.0 * (1 - pow(survivor[surv], exp(a)));
return score;

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}

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}

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