Joseph Buskmiller

Rong xu

Dacheng Jiang

Wenhui (Esther) Li

I: Variables:

sex

age

cholesterol Level

smoker?

hdl

blood\_pressure

bp\_treated?

age\_points

tot\_cholesterol\_points

smoking\_points

hdl\_points

bp\_points

tot\_points

decade\_risk

II: Steps:

Step 1: Gather Input on risk factors

The program will prompt the user to input data about sex, age, cholesterol level, smoker?, hdl, blood\_pressure, bp\_treated?

Step 2: Convert some variables that were strings to floats

The program will run a few if statements for bp\_treated? and smoker? and convert them to booleans with the proper value.

Step 2: Calculate Risk Points for Age

The program will use conditional statements based on age and gender to assess the user’s risk points from age, and add that to the age\_points variable.

Step 3: Calculate Risk Points for Total Cholesterol

The program will use conditional statements based on age, sex, and total cholesterol to calculate the user’s risk points from age, and add that to the tot\_cholesterol\_points variable.

Step 4: Calculate Risk Points for Smoking

The program will use conditional statements based on age, sex, and smoker? to calculate the user’s risk points from age, and add that to the smoking\_points variable.

Step 5: Calculate Risk Points for hdl

The program will use conditional statements based on hdl to calculate the user’s risk points from age, and add that to the hdl\_points variable.

Step 6: Calculate Risk points for Systolic\_BP

The program will use conditional statements based on systolic\_bp, bp\_treated, and sex to calculate the user’s risk points from systolic bp, and add that to the bp\_points variable.

Step 5: Calculate sum of points from each category

The program will add the variables age\_points, tot\_cholesterol\_points, smoking\_points, hdl\_points, and bp\_points to tot\_points

Step 6: Calculate 10 year Risk % from total points

The program will use conditional statements to find the user’s 10-year-risk from the variable tot\_points, and set decade\_risk to that value

Step 7: Output

The program will output the a message telling the user about their risk for heart disease along with the variable decade\_risk.

III: Test Cases:

#table

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Test Number/point | sex | age | tot\_cholesterol | smoker? | HDL | systolic\_bp | Bp\_treated | Tot\_points |
| 0 | M | 54 | 215 | N | 45 | 131 | N | 11 |
|  |  | 6 | 3 | 0 | 1 |  | 1 | 8% |
| 1 | M | 67 | 250 | Y | 68 | 147 | Y | 15 |
|  |  | 11 | 2 | 1 | -1 |  | 2 | 20% |
| 2 | F | 23 | 150 | N | 57 | 125 | N | -6 |
|  |  | -7 | 0 | 0 | 0 |  | 1 | <1% |
| 3 | F | 48 | 234 | N | 63 | 133 | N | 8 |
|  |  | 3 | 4 | 0 | -1 |  | 2 | 1% |
| 4 | M | 41 | 287 | Y | 46 | 128 | Y | 12 |
|  |  | 0 | 5 | 5 | 1 |  | 1 | 10% |
| 5 | F | 31 | 275 | N | 39 | 159 | Y | 11 |
|  |  | -7 | 11 | 0 | 2 |  | 5 | 1% |
| 6 | F | 22 | 221 | N | 44 | 134 | Y | 6 |
|  |  | -7 | 8 | 0 | 1 |  | 4 | <1% |
| 7 | M | 24 | 187 | Y | 53 | 146 | N | 4 |
|  |  | -9 | 4 | 8 | 0 |  | 1 | 1% |
| 8 | M | 39 | 153 | Y | 54 | 180 | N | 6 |
|  |  | -4 | 0 | 8 | 0 |  | 2 | 2% |
| 9 | M | 72 | 293 | N | 33 | 120 | Y | 16 |
|  |  | 12 | 1 | 0 | 2 |  | 1 | 25% |
| 10 | F | 57 | 178 | Y | 42 | 117 | Y | 15 |
|  |  | 8 | 2 | 4 | 1 |  | 0 | 3% |
| 11 | M | 66 | 159 | Y | 75 | 153 | N | 12 |
|  |  | 11 | 0 | 1 | -1 |  | 1 | 10% |
| 12 | F | 76 | 225 | N | 58 | 160 | N | 21 |
|  |  | 16 | 1 | 0 | 0 |  | 4 | 14% |
| 13 | F | 52 | 240 | Y | 41 | 133 | Y | 20 |
|  |  | 6 | 5 | 4 | 1 |  | 4 | 11% |
| 14 | F | 68 | 178 | N | 61 | 125 | N | 13 |
|  |  | 12 | 1 | 0 | -1 |  | 1 | 2% |
| 15 | F | 79 | 249 | Y | 38 | 137 | N | 23 |
|  |  | 16 | 2 | 1 | 2 |  | 2 | 22% |
| 16 | M | 71 | 290 | Y | 55 | 154 | Y | 16 |
|  |  | 12 | 1 | 1 | 0 |  | 2 | 25% |
| 17 | M | 56 | 159 | N | 70 | 137 | N | 8 |
|  |  | 8 | 0 | 0 | -1 |  | 1 | 4% |
| 18 | F | 65 | 259 | Y | 36 | 160 | Y | 25 |
|  |  | 12 | 3 | 2 | 2 |  | 6 | 30% |
| 19 | M | 73 | 200 | Y | 54 | 141 | Y | 15 |
|  |  | 12 | 0 | 1 | 0 |  | 2 | 20% |
| 20 | F | 37 | 155 | Y | 38 | 121 | Y | 11 |
|  |  | -3 | 0 | 9 | 2 |  | 3 | 11% |
| 21 | M | 63 | 369 | Y | 48 | 156 | N | 16 |
|  |  | 10 | 3 | 1 | 1 |  | 1 | 25% |
| 22 | M | 41 | 294 | N | 45 | 142 | Y | 10 |
|  |  | 0 | 8 | 0 | 1 |  | 1 | 6% |
| 23 | F | 48 | 191 | N | 65 | 126 | N | 6 |
|  |  | 3 | 3 | 0 | -1 |  | 1 | <1% |
| 24 | F | 43 | 180 | Y | 49 | 136 | N | 13 |
|  |  | 0 | 3 | 7 | 1 |  | 2 | 2% |
| 25 | M | 74 | 147 | Y | 56 | 167 | N | 15 |
|  |  | 12 | 0 | 1 | 0 |  | 2 | 20% |
| 26 | M | 38 | 199 | N | 39 | 164 | Y | 5 |
|  |  | -4 | 4 | 0 | 2 |  | 3 | 2% |
| 27 | M | 51 | 212 | Y | 58 | 138 | Y | 14 |
|  |  | 6 | 3 | 3 | 0 |  | 2 | 16% |
| 28 | F | 66 | 201 | N | 40 | 149 | N | 18 |
|  |  | 12 | 2 | 0 | 1 |  | 3 | 6% |
| 29 | F | 78 | 288 | N | 49 | 135 | N | 21 |
|  |  | 16 | 2 | 0 | 1 |  | 2 | 14% |
| 30 | F | 22 | 300 | N | 59 | 163 | Y | 12 |
|  |  | -7 | 13 | 0 | 0 |  | 6 | 1% |

#test cases

Case 0(typical):

Input: sex=M

age=54-->age\_point=6

tot\_cholesterol=215-->chol\_point=3

IF smoker=N-->smo\_point=0

HDL=45-->hdl\_point=1

BP treated=N/systolic\_bp=131-->sys\_point=1

tot\_point=11

Output: risk percentage=8%

Case 1(typical):

Input: sex=M

age=67-->age\_point=11

tot\_cholesterol=250-->chol\_point=2

IF smoker=y-->smo\_point=1

HDL=68-->hdl\_point=-1

BP treated=Y/systolic\_bp=147-->sys\_point=2

tot\_point=15

Output: risk percentage=20%

Case 2(edge):

Input: sex=F

age=23-->age\_point=-7

tot\_cholesterol=150-->chol\_point=0

IF smoker=N-->smo\_point=0

HDL=57-->hdl\_point=0

BP treated=N/systolic\_bp=125-->sys\_point=1

tot\_point=-6

Output: risk percentage=<1%

Case 3(edge):

Input: sex=F

age=48-->age\_point=3

tot\_cholesterol=234-->chol\_point=4

IF smoker=N-->smo\_point=0

HDL=63-->hdl\_point=-1

BP treated=N/systolic\_bp=133-->sys\_point=2

tot\_point=8

Output: risk percentage<1%

Case 4(typical):

Input: sex=M

age=41-->age\_point=0

tot\_cholesterol=287-->chol\_point=8

IF smoker=y-->smo\_point=5

HDL=46-->hdl\_point=1

BP treated=Y/systolic\_bp=128-->sys\_point=1

tot\_point=12

Output: risk percentage=10%

Case 5(edge):

Input: sex=F

age=31-->age\_point=-7

tot\_cholesterol=275-->chol\_point=11

IF smoker=N-->smo\_point=0

HDL=39-->hdl\_point=2

BP treated=Y/systolic\_bp=159-->sys\_point=5

tot\_point=11

Output: risk percentage=1%

Case 6(edge):

Input: sex=F

age=22-->age\_point=-7

tot\_cholesterol=275-->chol\_point=11

IF smoker=N-->smo\_point=0

HDL=44-->hdl\_point=1

BP treated=Y/systolic\_bp=134-->sys\_point=4

tot\_point=6

Output: risk percentage=<1%

Case 7(typical):

Input: sex=M

age=24-->age\_point=-9

tot\_cholesterol=189-->chol\_point=4

IF smoker=Y-->smo\_point=8

HDL=53-->hdl\_point=0

BP treated=Y/systolic\_bp=146-->sys\_point=2

tot\_point=6

Output: risk percentage=2%

Case 8(typical):

Input: sex=M

age=39-->age\_point=-4

tot\_cholesterol=153-->chol\_point=0

IF smoker=Y-->smo\_point=8

HDL=54-->hdl\_point=0

BP treated=Y/systolic\_bp=180-->sys\_point=2

tot\_point=6

Output: risk percentage=2%

Case 9(typical):

Input: sex=M

age=72-->age\_point=12

tot\_cholesterol=293-->chol\_point=1

IF smoker=N-->smo\_point=0

HDL=33-->hdl\_point=2

BP treated=N/systolic\_bp=120-->sys\_point=1

tot\_point=16

Output: risk percentage=25%

Case 10(typical):

Input: sex=F

age=57-->age\_point=8

tot\_cholesterol=178-->chol\_point=2

IF smoker=Y-->smo\_point=4

HDL=42-->hdl\_point=1

BP treated=Y/systolic\_bp=117-->sys\_point=0

tot\_point=15

Output: risk percentage=3%

Case 11(typical):

Input: sex=M

age=66-->age\_point=11

tot\_cholesterol=159-->chol\_point=0

IF smoker=Y-->smo\_point=1

HDL=75-->hdl\_point=-1

BP treated=Y/systolic\_bp=153-->sys\_point=1

tot\_point=12

Output: risk percentage=10%

Case 12(typical):

Input: sex=F

age=76-->age\_point=16

tot\_cholesterol=225-->chol\_point=1

IF smoker=N-->smo\_point=0

HDL=58-->hdl\_point=0

BP treated=N/systolic\_bp=160-->sys\_point=4

tot\_point=21

Output: risk percentage=14%

Case 13(typical):

Input: sex=F

age=52-->age\_point=6

tot\_cholesterol=240-->chol\_point=5

IF smoker=Y-->smo\_point=4

HDL=41-->hdl\_point=1

BP treated=Y/systolic\_bp=133-->sys\_point=4

tot\_point=20

Output: risk percentage=11%

Case 14(typical):

Input: sex=F

age=68-->age\_point=12

tot\_cholesterol=178-->chol\_point=1

IF smoker=N-->smo\_point=0

HDL=61-->hdl\_point=-1

BP treated=N/systolic\_bp=125-->sys\_point=1

tot\_point=13

Output: risk percentage=2%

Case 15(typical):

Input: sex=F

age=79-->age\_point=16

tot\_cholesterol=249-->chol\_point=2

IF smoker=Y-->smo\_point=1

HDL=38-->hdl\_point=2

BP treated=N/systolic\_bp=137-->sys\_point=2

tot\_point=23

Output: risk percentage=22%

Case 16(typical):

Input: sex=M

age=71-->age\_point=12

tot\_cholesterol=290-->chol\_point=1

IF smoker=Y-->smo\_point=1

HDL=55-->hdl\_point=0

BP treated=Y/systolic\_bp=154-->sys\_point=2

tot\_point=16

Output: risk percentage=25%

Case 17(typical):

Input: sex=M

age=56-->age\_point=8

tot\_cholesterol=159-->chol\_point=0

IF smoker=N-->smo\_point=0

HDL=70-->hdl\_point=-1

BP treated=N/systolic\_bp=137-->sys\_point=1

tot\_point=8

Output: risk percentage=4%

Case 18(edge):

Input: sex=F

age=65-->age\_point=12

tot\_cholesterol=259-->chol\_point=3

IF smoker=Y-->smo\_point=2

HDL=36-->hdl\_point=2

BP treated=Y/systolic\_bp=160-->sys\_point=6

tot\_point=25

Output: risk percentage=30%

Case 19(typical):

Input: sex=M

age=73-->age\_point=12

tot\_cholesterol=200-->chol\_point=0

IF smoker=Y-->smo\_point=1

HDL=54-->hdl\_point=0

BP treated=Y/systolic\_bp=141-->sys\_point=2

tot\_point=15

Output: risk percentage=20%

Case 20(typical):

Input: sex=F

age=37-->age\_point=-3

tot\_cholesterol=155-->chol\_point=0

IF smoker=Y-->smo\_point=9

HDL=38-->hdl\_point=2

BP treated=Y/systolic\_bp=121-->sys\_point=3

tot\_point=11

Output: risk percentage=11%

Case 21(typical):

Input: sex=M

age=63-->age\_point=10

tot\_cholesterol=369-->chol\_point=3

IF smoker=Y-->smo\_point=1

HDL=48-->hdl\_point=1

BP treated=N/systolic\_bp=156-->sys\_point=1

tot\_point=16

Output: risk percentage=25%

Case 22(typical):

Input: sex=M

age=41-->age\_point=0

tot\_cholesterol=294-->chol\_point=8

IF smoker=N-->smo\_point=0

HDL=45-->hdl\_point=1

BP treated=Y/systolic\_bp=142-->sys\_point=1

tot\_point=10

Output: risk percentage=6%

Case 23(edge):

Input: sex=F

age=48-->age\_point=3

tot\_cholesterol=191-->chol\_point=3

IF smoker=N-->smo\_point=0

HDL=65-->hdl\_point=-1

BP treated=N/systolic\_bp=126-->sys\_point=1

tot\_point=6

Output: risk percentage<1%

Case 24(typical):

Input: sex=F

age=43-->age\_point=0

tot\_cholesterol=180-->chol\_point=3

IF smoker=Y-->smo\_point=7

HDL=49-->hdl\_point=1

BP treated=N/systolic\_bp=136-->sys\_point=2

tot\_point=13

Output: risk percentage=2%

Case 25(typical):

Input: sex=M

age=74-->age\_point=12

tot\_cholesterol=147-->chol\_point=0

IF smoker=Y-->smo\_point=1

HDL=56-->hdl\_point=0

BP treated=N/systolic\_bp=167-->sys\_point=2

tot\_point=15

Output: risk percentage=20%

Case 26(typical):

Input: sex=M

age=38-->age\_point=-4

tot\_cholesterol=199-->chol\_point=4

IF smoker=N-->smo\_point=0

HDL=39-->hdl\_point=2

BP treated=Y/systolic\_bp=164-->sys\_point=3

tot\_point=5

Output: risk percentage=2%

Case 27(typical):

Input: sex=M

age=51-->age\_point=6

tot\_cholesterol=212-->chol\_point=3

IF smoker=Y-->smo\_point=3

HDL=58-->hdl\_point=0

BP treated=Y/systolic\_bp=138-->sys\_point=2

tot\_point=14

Output: risk percentage=16%

Case 28(typical):

Input: sex=F

age=66-->age\_point=12

tot\_cholesterol=201-->chol\_point=2

IF smoker=N-->smo\_point=0

HDL=40-->hdl\_point=1

BP treated=N/systolic\_bp=149-->sys\_point=3

tot\_point=18

Output: risk percentage=6%

Case 29(typical):

Input: sex=F

age=78-->age\_point=16

tot\_cholesterol=288-->chol\_point=2

IF smoker=N-->smo\_point=0

HDL=49-->hdl\_point=1

BP treated=N/systolic\_bp=135-->sys\_point=2

tot\_point=21

Output: risk percentage=14%

Case 30(edge):

Input: sex=F

age=22-->age\_point=-7

tot\_cholesterol=300-->chol\_point=13

IF smoker=N-->smo\_point=0

HDL=59-->hdl\_point=1

BP treated=Y/systolic\_bp=163-->sys\_point=6

tot\_point=12

Output: risk percentage=1%