



Problem of the Week

Problem E

How Small Can It Get?

A computer program takes in two inputs, InputⒶ and InputⒷ, and produces one Final OutputⒶ as follows.

InputⒶ is doubled, then the result is squared. This result is then reduced by 4 times InputⒶ. The result is OutputⒶ.

InputⒷ is squared, then the result is increased by 6 times InputⒷ. The result is OutputⒷ.

The program produces a Final OutputⒶ = OutputⒶ + OutputⒷ.

For example, if InputⒶ is 5, then OutputⒶ is 80:

$$\begin{array}{ccccccc} \text{InputⒶ} & \rightsquigarrow & \text{double} & \rightsquigarrow & \text{square} & \rightsquigarrow & \text{reduce by } 4 \times (\text{original input}) & \rightsquigarrow & \text{OutputⒶ} \\ 5 & & 10 & & 100 & & 100 - 4(5) = 80 & & 80 \end{array}$$

If InputⒷ is 8, then OutputⒷ is 112:

$$\begin{array}{ccccccc} \text{InputⒷ} & \rightsquigarrow & \text{square} & \rightsquigarrow & \text{increase by } 6 \times (\text{original input}) & \rightsquigarrow & \text{OutputⒷ} \\ 8 & & 64 & & 64 + 6(8) = 112 & & 112 \end{array}$$

So if InputⒶ is 5 and InputⒷ is 8, the computer program will output Final OutputⒶ = OutputⒶ + OutputⒷ = 80 + 112 = 192.

Determine the minimum final output and the two input values which produce this minimum.

