AI4ICPS IIT Kharagpur	**IIT KHARAGPUR AI4ICPS I HUB FOUNDATION** **H**ands-on **A**pproach to **AI, Cohort-2, July – October 2024** **Programming Assignment 3: Unsupervised Learning in Python**

Due date: Friday 23rd August 2024, EOD – IST

Important Instructions about Programming Assignments

1. Programming assignments will be evaluated automatically. **Do not** change the skeleton code provided to you.
2. Write your code **only in the designated places** in the skeleton code and process the input data provided to you in the designated variables. **Do not alter** the input-output structure in the skeleton code.
3. **Do not import** any additional libraries. **Do not use any additional files** for the processing (other than those mentioned in the skeleton code).
4. Failure to comply with these instructions may lead to you getting **zero marks** for the assignment, even if the solution is largely correct.

Objective: This assignment has two objectives:

1. Understanding how to implement the K-Means clustering algorithm for a real dataset.
2. Develop a pipeline to solve the problem and provide accurate output using basic programming logic.

Problem: Write a Python program using the provided template to find the best K in the KMeans algorithm using the Silhouette Coefficient metric for the 'housing.csv' dataset. The program should accept two integers that define the range of K values and output only the best K and nothing else.

Instructions: Download the template program and write your code in the designated location mentioned in the comments. Initialize the K-Means model: You must use n_init='auto' and random_state=0 as KMeans model parameters. Use the given dataset (housing.csv) and calculate the Silhouette Coefficient for the range of K provided. Output the best K with respect to the Silhouette Coefficient.

You should read the skeleton code to understand the exact mechanism of input from the command line and provide the required output.

Execution Syntax: `python assignment.py <number> <number>`

Sample Test Cases:

Input	2 4	3 7	13 17	21 25	7 10
Output	2	3	14	24	8