VIETNAM NATIONAL UNIVERSITY - HO CHI MINH CITY
HO CHI MINH CITY UNIVERSITY OF TECHNOLOGY
FACULTY OF COMPUTER SCIENCE AND ENGINEERING

PROGRAMMING FUNDAMENTALS - CO1027

ASSIGNMENT 0

SHERLOCK
A STUDY IN PINK - Part 1

HO CHI MINH CITY, 12/2021

ASSIGNMENT'S SPECIFICATION

Version 1.0

1 Assignment's outcome

After completing this assignment, students review and make good use of the branching and looping statements that learned in the Introduction to Computing course.

2 Introduction

This assignment is based on episode 1 season 1 of a TV series on BBC named Sherlock. This series is a British mystery crime drama television series based on Sir Arthur Conan Doyle's Sherlock Holmes detective stories.

John Watson is a military medic resting in London after being wounded in Afghanistan. He was thinking about changing to another apartment with a lower rent when he accidentally met an old friend. Watson was then introduced to Sherlock Holmes by that friend to share a room at 221B Baker Street, owned by Mrs. Hudson. From there, Watson was drawn into Sherlock's challenging cases, and Sherlock had a new companion in his quest to solve the case.

3 Input data

The program's input data is stored in file `input.txt`. This file stores the information in the following format:

$$\mathbf{HP_1}\text{␣}\mathbf{HP_2}$$
$$\mathbf{EXP_1}\text{␣}\mathbf{EXP_2}$$
$$\mathbf{M_1}\text{␣}\mathbf{M_2}$$
$$\mathbf{E_1}\text{␣}\mathbf{E_2}\text{␣}\mathbf{E_3}$$

In detail:

- $\mathbf{HP_1}$ and $\mathbf{HP_2}$ is the health points of Sherlock and Watson, respectively, is an integer in

[0, 999]. In any calculation case, if the HP is over 999, you must set it to 999. Otherwise, if HP is less than 0, it must be set to 0.

- $\mathbf{EXP_1}$ and $\mathbf{EXP_2}$ is the experience points when solving the cases of Sherlock and Watson, respectively, is an integer in [0, 900]. The more clues is found, the higher the experience points are. In any calculation case, if the HP is over 900, you must set it to 900. Otherwise, if HP is less than 0, it must be set to 0.
- $\mathbf{M_1}$ and $\mathbf{M_2}$ is the initial money of Sherlock and Watson, respectively, is an integer in [0, 2000]. If the money is over 2000, you must set it to 2000. Otherwise, if the money is less than 0, it must be set to 0.
- $\mathbf{E_1}$, $\mathbf{E_2}$, $\mathbf{E_3}$ are the event codes of the 3 missions in this assignment, respectively, is an integer in [0, 999].
  Note:
  - In any case if the calculation results in a non-integer for **HP**, **EXP** and **M**, that number must be rounded up immediately.
  - Each mission will have its case, if $\mathbf{E_i}$ is **outside the range** given in the case of the mission, the mission function will return -999.

4 Mission

Students are asked to build a program in C++ to simulate the first case of Sherlock and Watson: A study in Pink, through the tasks described below.

4.1 Mission 1: The first encounter (3 points)

In the first meeting, Watson witnessed Sherlock's genius deductive ability. Sherlock guesses Watson's return from Afghanistan and other details behind Watson's life. Students were asked to write a function to describe the process that Sherlock explains to Watson his deductions. Through this process, Watson's and Sherlock's **EXP** will change:

- Function name: firstMeet.
- Input parameters:
  - $\mathbf{EXP_1}$: Sherlock's experience points.
  - $\mathbf{EXP_2}$: Watson's experience points.
  - $\mathbf{E_1}$: Code that identify event 1

- Return value: The integer is the sum of $\mathbf{EXP_1}$ and $\mathbf{EXP_2}$

Note: In the function in this and later mission, the parameters representing the mutable indices will be passed by reference. When there is a request to update the variables, students need to make updates on these reference variables. Then, the variables passed in will also be updated accordingly.

4.1.1 Case 1

In the case of $\mathbf{EXP_1}$ in range [0, 399], Sherlock explains how he knows Watson has just returned from Afghanistan. Here are the things Sherlock describes that change Watson's **EXP**:

Information	E_1's range	Sherlock's Observation	Outcome
1	[0,49]	Watson's hairstyle and manner of speech are like those of the military	Add 25 EXP
2	[50,99]	His face is tanned but not tanned under the wrist, proving that Watson has returned from abroad	Add 50 EXP
3	[100,149]	Watson limped, but when they met, he chose to stand without asking for a chair, so he had psychological problems after being injured. This could be an injury caused by action on the battlefield	Add 85 EXP
4	[150,199]	Sherlock explain Information 1 and Information 2	Add EXP that equal to a total of Information 1 and Information 2
5	[200,249]	Sherlock explain Information 1 and Information 3	Add EXP that equal to a total of Information 1 and Information 3
6	[250,299]	Sherlock explain Information 2 and Information 3	Add EXP that equal to a total of Information 2 and Information 3
7	[300,399]	Sherlock explain Information 1, Information 2 and Information 3	Add EXP that equal to a total of Information 1 and Information 2 and Information 3

From the above information, Sherlock guessed that Watson was a military doctor returning from abroad, his search range was reduced to 2 countries: Afghanistan or Iraq. If E_1 is an odd number, Sherlock will make a prediction in favor of Afghanistan (and it is a correct choice), then his EXP will be added by an amount equal to $E_1/10$. Conversely, if E_1 is an even number, Sherlock will lean towards the possibility of Iraq, which is a bad choice and his EXP is reduced by $E_1/5$.

Example 1: With $\mathbf{EXP_1} = 100$, $\mathbf{EXP_2} = 75$, $\mathbf{E_1} = 34$. Base on information 1:

$$\mathbf{EXP_2} = \mathbf{EXP_2} + 25 = 75 + 25 = 100$$

$\mathbf{E_1}$ is an even, $\mathbf{EXP_1}$ is decreased to:

$$\mathbf{EXP_1} = \mathbf{EXP_1} - \mathbf{E_1}/5 = 100 - 6.8 = 93.2 \xrightarrow{\text{Round up}} 94$$

This function will return:

$$\text{output} = \mathbf{EXP_1} + \mathbf{EXP_2} = 94 + 100 = 194$$

Example 2: With $\mathbf{EXP_1} = 500$, $\mathbf{EXP_2} = 850$, $\mathbf{E_1} = 151$. Base on information 4, $\mathbf{EXP_2}$ will increase corresponds to information 1 and information 2:

$$\mathbf{EXP_2} = \mathbf{EXP_2} + 25 + 50 = 800 + 25 + 50 = 925 \xrightarrow{>900} 900$$

$\mathbf{E_1}$ is an odd, $\mathbf{EXP_1}$ will increase:

$$\mathbf{EXP_1} = \mathbf{EXP_1} + \mathbf{E_1}/10 = 500 + 15.1 = 515.1 \xrightarrow{\text{Round up}} 516$$

This function will return:

$$\text{output} = \mathbf{EXP_1} + \mathbf{EXP_2} = 516 + 900 = 1416$$

4.1.2 Case 2

In the case of $\mathbf{E_1}$ in range [400, 999], Sherlock explains how he knows Watson has an older brother. Here's the information Sherlock describes that changes Watson's **EXP**:

information	$\mathbf{E_1}$'s range	Sherlock's Observation	Outcome
1	[400,499]	Watson has an expensive phone but he is looking for a roommate to share the rent, the phone must have been given to Watson by someone else	Add ($\mathbf{E_1}$/7+9) EXP
2	[500,599]	The phone has many scratches indicating that it has been placed with many other items such as keys, coins. Watson wouldn't do that to a luxury item. This is caused by the previous owner with the phone	Add ($\mathbf{E_1}$/9+11) EXP
3	[600,699]	On the phone is engraved the name: Harry Watson, showing that this was given to him by an old family member	Add ($\mathbf{E_1}$/5+6) EXP
4	[700,799]	Sherlock explains information 1; after Watson finished listening and $\mathbf{EXP_2}$ was updated, if $\mathbf{EXP_2} > 200$, Sherlock continued to interpret the information 2 and Watson was updated with $\mathbf{EXP_2}$ respectively.	(As described).
5	[800,999]	Sherlock explains information 1 and 2; after Watson finished listening and $\mathbf{EXP_2}$ was updated, if $\mathbf{EXP_2} > 600$, Sherlock continued to interpret the information 3 and Watson was updated with $\mathbf{EXP_2}$ respectively.	(As described).

Note: If Watson is explained by Sherlock with all 3 information 1, 2 and 3, Watson will be added 15% of the current EXP (after updating the EXP for all 3 information)

After Sherlock explained the information to Watson, Watson said: "Harry stands for Harriet". Thus, Harry is Watson's sister, not his brother. Surprised by this mistake, Sherlock's EXP is reduced by 10% of $\mathbf{E_1}$.

Example 3: With $\mathbf{EXP_1} = 500$, $\mathbf{EXP_2} = 450$, $\mathbf{E_1} = 401$. Base on information 1:

$$\mathbf{EXP_2} = \mathbf{EXP_2} + (\mathbf{E_1}/7 + 9) \approx 516.29 \xrightarrow{\text{Round up}} 517$$

$\mathbf{EXP_1}$ reduce to:

$$\mathbf{EXP_1} = \mathbf{EXP_1} - 0.1 * \mathbf{E_1} = 500 - 0.1 * 401 = 459.9 \xrightarrow{\text{Round up}} 460$$

This function return:

$$\text{output} = 460 + 517 = 977$$

Example 4: $\mathbf{EXP_1} = 500$, $\mathbf{EXP_2} = 450$, $\mathbf{E_1} = 801$. Base on information 5, $\mathbf{EXP_2}$ (of Watson) will update base on information 1 and 2:

$$\mathbf{EXP_2} = \mathbf{EXP_2} + (\mathbf{E_1}/7 + 9) + (\mathbf{E_1}/9 + 11) \approx 673.43 \xrightarrow{\text{Round up}} 674$$

$\mathbf{EXP_2} > 600$ Sherlock continues to explain information 3 and $\mathbf{EXP_2}$ will increase:

$$\mathbf{EXP_2} = \mathbf{EXP_2} + (\mathbf{E_1}/5 + 6) = 840.2 \xrightarrow{\text{Round up}} 841$$

Watson is explained by Sherlock with all 3 information 1, 2 and 3, Watson's experience is added 15%:

$$\mathbf{EXP_2} = \mathbf{EXP_2} * 1.15 \xrightarrow{\text{Round up}} 968 \xrightarrow{\text{Greater than 900}} 900$$

$\mathbf{EXP_1}$ reduce to:

$$\mathbf{EXP_1} = \mathbf{EXP_1} - 0.1 * \mathbf{E_1} = 419.9 \xrightarrow{\text{Round up}} 420$$

This function return:

$$\text{output} = 900 + 420 = 1320$$

4.2 Mission 2: Investigate the scene

After their first meeting, Watson was surprised at Sherlock's genius deductive abilities. The very next day, the two went to see Mrs. Hudson's apartment at 221B Baker Street. Watson felt satisfied with the area and interior of the apartment. He sat down on the chair and reached for the newspaper on the table. The cover of the newspaper was about three recent suicides with the same poison. At the same time, Sherlock looked out of the window and saw a car stop just below the apartment. Very quickly, he guessed that the fourth suicide had happened and there was a new point in this case. Inspector Lestrade - the person in charge of these suicide cases,

was also the driver of the car. He pushed the door and walked in. Sherlock asked: "What's new in this case?" - "The victim left a message." Lestrade answer. Then, Sherlock and Watson came to the scene.

Students are asked to write a function to represent the field investigation process, describing the function as follows:

- Name: investigateScene.
- Input parameter:
  - Sherlock's experience points: $\mathbf{EXP_1}$
  - Watson's experience points: $\mathbf{EXP_2}$
  - Watson's health points: $\mathbf{HP_2}$
  - Watson's money: $\mathbf{M_2}$
  - Event code: $\mathbf{E_2}$
- Return value: The integer is the sum of $\mathbf{EXP_2}$, $\mathbf{HP_2}$, $\mathbf{M_2}$ and $\mathbf{EXP_1}$

4.2.1 Stage 1:

If $\mathbf{E_2}$ is in [0, 299], Sherlock finds a ring on the victim's finger whose inner shark is clean. She must have taken off her ring often to do various work. **EXP** after finding out this detail will be added an equal amount ($\mathbf{E_2}/9 + 10$) for Watson. In all the change **EXP** in Stage 1, since Sherlock can easily see the details to explain to Watson, Sherlock's **EXP** will increase but less than Watson's. Specifically, each time Watson's **EXP** increases by d, Sherlock's EXP increases by d/3, this does not apply if Watson's **EXP** decreases.

If $\mathbf{E_2}$ is in range [300, 499], Sherlock explains information as when $\mathbf{E_2}$ is in range [0, 299], plus the information about the coat. So, before hearing about the coat, Watson's EXP must increase accordingly the information about the ring. About the jacket, moisture under the collar indicates that she pulled it up to protect against wind and rain. It's not raining in London right now so she must have come from somewhere else. Sherlock searched on his phone, the nearest place that was both raining and windy was Cardiff. Watson's EXP is increased by 35% of $\mathbf{E_2}$.

Inspector Lestrade said that his team did not find any suitcases. Sherlock immediately thought that the luggage had been left in the criminal's car. He rushed to find the suitcase and left Watson at the scene.

4.2.2 Stage 2:

Watson was left behind by Sherlock at the crime scene, he didn't know which way to went to get home. After walking a long distance $\mathbf{E_2}^3$ (cube of $\mathbf{E_2}$) with a leg that had been wound before, his HP is reduced by $\mathbf{E_2}^3/2^{23}$. When he stopped to rest, he was kidnapped by a group of strangers and led to meet Mycroft - Sherlock's brother. Mycroft offers Watson some money in exchange for information about Sherlock. If $\mathbf{E_2}$ is an odd number, Watson will disagree with this request. If $\mathbf{E_2}$ is an even number, Sherlock texted Watson telling him to take the money and asking for an advance payment now. Then, Watson's M amount would be added by an interval equal to $\mathbf{E_2}^2/50$ Watson was then taken by Mycroft's people to the apartment in 221B Baker Street.

Example 5: $\mathbf{E_2} = 295$, $\mathbf{EXP_1} = 600$, $\mathbf{EXP_2} = 350$, $\mathbf{HP_2} = 450$, $\mathbf{M_2} = 1000$. We will have:

$$d = \mathbf{E_2}/9 + 10 \approx 42.78$$

$$\mathbf{EXP_2} = \mathbf{EXP_2} + d = \approx 392.78 \xrightarrow{\text{Round up}} 393$$

$$\mathbf{EXP_1} = \mathbf{EXP_1} + d/3 = 614.26 \xrightarrow{\text{Round up}} 615$$

$$\mathbf{HP_2} = \mathbf{HP_2} - \mathbf{E_2}^3/2^{23} \approx 446.94 \xrightarrow{\text{Round up}} 447$$

Because $\mathbf{E_2}$ is an odd number, $\mathbf{M_2}$ will not change.
This function returns:

$$\text{output} = \mathbf{EXP_2} + \mathbf{HP_2} + \mathbf{M_2} + \mathbf{EXP_1} = 393 + 447 + 1000 + 615 = 2455$$

Example 6: $\mathbf{E_2} = 302$, $\mathbf{EXP_1} = 600$, $\mathbf{EXP_2} = 350$, $\mathbf{HP_2} = 450$, $\mathbf{M_2} = 1000$. We will have:

$$d_1 = (\mathbf{E_2}/9 + 10) \approx 43.56$$

$$\mathbf{EXP_2} = \mathbf{EXP_2} + d_1 \approx 393.56 \xrightarrow{\text{Round up}} 394$$

$$\mathbf{EXP_1} = \mathbf{EXP_1} + d_1/3 = 614.52 \xrightarrow{\text{Round up}} 615$$

$$d2 = 0.35 * \mathbf{E_2} = 105.7$$

$$\mathbf{EXP_2} = \mathbf{EXP_2} + d_2 = 499.7 \xrightarrow{\text{Round up}} 500$$

$$\mathbf{EXP_1} = \mathbf{EXP_1} + d_2/3 \approx 650.23 \xrightarrow{\text{Round up}} 651$$

$$\mathbf{HP_2} = \mathbf{HP_2} - \mathbf{E_2}^3/2^{23} \approx 446.72 \xrightarrow{\text{Round up}} 447$$

Because $\mathbf{E_2}$ is an even number, so $\mathbf{M_2}$ will be increase to:

$$\mathbf{M_2} = \mathbf{M_2} + \mathbf{E_2}^2/50 = 2824.08 \xrightarrow{\text{Greater than 2000}} 2000$$

This function returns:

$$\text{output} = \mathbf{EXP_2} + \mathbf{HP_2} + \mathbf{M_2} + \mathbf{EXP_1} = 500 + 447 + 2000 + 651 = 3598$$

4.3 Mission 3: Tracing the luggage

About Sherlock, he was walking along the roads from Cardiff to the crime scene in search of the victim's luggage.

Students are asked to write a function to describe Sherlock's luggage searching process, the function information is described as follows:

- Name: traceLuggage.
- Input parameter:
  - Sherlock's health points: $\mathbf{HP_1}$
  - Sherlock's experience points: $\mathbf{EXP_1}$
  - Sherlock's money: $\mathbf{M_1}$
  - Event code: $\mathbf{E_3}$
- Return value: $\mathbf{HP_1} + \mathbf{EXP_1} + \mathbf{M_1}$

After ruling out the possibilities, Sherlock found 4 possible roads the criminal took the victim and it is possible that he will dump the luggage on the roadside when he discovers the luggage in the car. Sherlock must try each route to find the lost luggage. In each of the following roads, a potential location (possibly with luggage) is marked with an integer within the range [65,

90]. If the location had the luggage, it would be marked with the integer number 80. 80 is the ASCII code for the character 'P', which stands for Pink, which is the color of the jacket the victim was wearing. In Sherlock's mind, this is a woman who loves the color pink.

4.3.1 Road 1:

Let P1 be a sequence of the first 9 odd positive integers, in ascending order. For each element p_{1i} in $P1$, perform the following transformation:

$$p_{1i} = (p_{1i} + \mathbf{E_3})\%26 + 65$$

Once again, each element in the sequence P1 represents a location where the victim's luggage **can be** found; location with element 80 represents the location **with** luggage. Sherlock searches in turn from the first to the last position. If Sherlock found the baggage in the k-th position, (k is calculated from 1, the first position corresponds to k = 1), Sherlock's stats would be updated as follows:

- Because of the loss of strength when searching, HP is reduced by an amount equal to $p_{1i} * k * 2$
- Since an important information was found, EXP increases by $(1000 - p1i * k)\%101$

In all 4 roads, Sherlock take a Taxi to go to the locations that might have the luggage. In each road, if Sherlock found the luggage at position k, Sherlock's money $\mathbf{M_1}$ would be reduce by:

$$k * \mathbf{E_3}/9$$

Conversely, if Sherlock does not find any luggage on that road, Sherlock's M will be reduce by (his **HP** and **EXP** are remained):

$$n^2 * \mathbf{E_3}/9$$

Where n is the number of positions that need to be traversed to find the baggage of each road.

Example 7: $\mathbf{E_3} = 500$, $\mathbf{HP_1} = 999$, $\mathbf{EXP_1} = 600$, $\mathbf{M_1} = 890$. We will have:

$$P_1 = 1, 3, 5, 7, 9, 11, 13, 15, 17$$

After transformation in P_1:

$$P_1 = 72, 74, 76, 78, 80, 82, 84, 86, 88$$

So: $k = 5$

$$\mathbf{HP_1} = \mathbf{HP_1} - 80 * 5 * 2 = 199$$

$$\mathbf{EXP_1} = \mathbf{EXP_1} + (1000 - 80 * 5)\%101 = 695$$

$$\mathbf{M_1} = \mathbf{M_1} - 5 * 500/9 \xrightarrow{\text{Round up}} 613$$

Because Sherlock didn't go all the road, so this example won't return the result

Note: For the sake of simplicity of programming, we will assume that even if Sherlock found his baggage in one of the paths, Sherlock would continues on the other paths without stopping halfway. Sherlock wanted to make sure he finds every item that could be the victim's luggage.

4.3.2 Road 2

Let P_2 be a sequence of the first 7 prime numbers, in ascending order. For each element p_{2i} in P_2, perform the following transformation:

$$p_{2i} = (p_{2i} + \mathbf{E_3})\%26$$

Let s and m be the sum and average of all the elements in P_2 (after transformation), respectively. Note that, m needs to be rounded immediately after calculating the value. Perform the second transformation as follows:

$$p_{2i} = (p_{2i} + s + m)\%26 + 65$$

The way to search and update HP, EXP for Sherlock is the same as done in Road 1.

4.3.3 Road 3

Let P_3 be a sequence of the first 20 positive integers that is a square number and an even number. For each element P_{3i} in P_3, perform the following transformation:

$$p_{3i} = (p_{3i} + \mathbf{E_3}^2)\%113$$

Let max is the maximum number in the number sequence that have been transformed. We will perform the second transformation:

$$p_{3i} = \lceil((p_{3i} + \mathbf{E_3})/max)\rceil\%26 + 65$$

Unlike the search method of the previous 2 roads, this time, Sherlock searches from the last position to the first position. Let k be the first position where Sherlock finds the luggage (k is calculated from 1, the first position **in the direction of Sherlock's search** corresponds to k = 1). Sherlock's stats will be updated as follows:

- **HP** decrease by $p_{3i} * k * 3$
- **EXP** increase by $(3500 - p_{3i} * k)\%300$

4.3.4 Road 4

Let P_4 be a sequence of 12 elements, each element being the number of days of a month in a non-leap year (according to the calendar), sorted in ascending order of month number. For example, the first 3 elements of P4 are:

$$31_a, 28, 31_b$$

Where, 31_a is the number of days in January, 28 is the number of days in February in a non-leap year, and 31_b is the number of days in March (a and b are just to distinguish between the two 31s). For each element p_{4i} in P_4, perform the following transformation:

$$p_{4i} = (p_{4i} + \lceil(\mathbf{E_3}/29)\rceil^3)\%9$$

Let min and min_idx be the smallest number and the first position of the smallest number in the transformed sequence P_4, respectively, with min_idx starting from 1. We perform the second transformation as follows:

$$p_{4i} = ((p_{4i} + \mathbf{E_3}) * \lceil (min/min\_idx) \rceil)\%26 + 65$$

Sherlock searches from the last position to the first position. Let k be the first position where Sherlock finds the luggage (k is calculated from 1, the first position in the direction of Sherlock's search corresponds to $k = 1$). Sherlock's stats will be updated as follows:

- **HP** decrease by $p_{4i} * k * 4$
- **EXP** increase by $(4500 - p_{4i} * k)\%400$

If after going through all 4 roads, Sherlock still can't find the luggage, Sherlock's stats are updated as follows:

- **HP** decrease by $(59 * \mathbf{E_3})\%900$
- **EXP** decrease by $(79 * \mathbf{E_3})\%300$

Also, the function should return -1

4.4 Ending

With Sherlock's talent, he can find the victim's luggage. Sherlock will bring it back to apartment 221B Baker and with his new partner, Watson, continue to search for the criminal. But this work will be saved for the next assignment for part 2 of A study in Pink. Both Sherlock and Watson look forward to taking a break this Lunar New Year. Wishing you all a good completion of this assignment and a happy New Year.

5 Submission

Students submit a file: **studyInPink.h** in the site "Ky thuat lap trinh (CO1027)_HK212_ALL"

Deadlines for submission are announced at the submission site above. By the deadline for submission, the link will be locked automatically, so students will not be able to submit them late. To avoid possible risks at the time of submission, students MUST submit their papers at least **one hour** before the deadline.

6 Handling fraud

Assignment must be done BY YOURSELF. Students will be considered fraudulent if:

- There is an unusual similarity between the source code of the submissions. In this case, ALL submissions are considered fraudulent. Therefore, students must protect the source code of their assignments.
- Students do not understand the source code written by themselves, except for the parts of the code provided in the initialization program. Students can consult from any source, but make sure they understand the meaning of all the lines they write. In the case of not understanding the source code of the place they refer, students are especially warned NOT to use this source code; instead use what has been learned to write programs.
- Mistakenly submit another student's assignment on your personal account.

In the case of cheating, students will get a 0 for the entire subject (not just the assignment).

DO NOT ACCEPT ANY INTERPRETATION AND NO EXCEPTION!

After each major assignment has been submitted, a number of students will be called for random interviews to prove that the assignment has been done by themselves.

7 Change from previous version

- **Section 3**: In Note, each mission will have its case, if E_i is **outside the range** given in the case of the mission, the mission function will return -999.

References

[1] A Study in Pink, Wikipedia, `https://en.wikipedia.org/wiki/A_Study_in_Pink`

[2] Sherlock, Season 1 - Episode 1: A Study in Pink, Netflix, `https://www.netflix.com/watch/70174779?trackId=13752289`.

END