**W1D4**

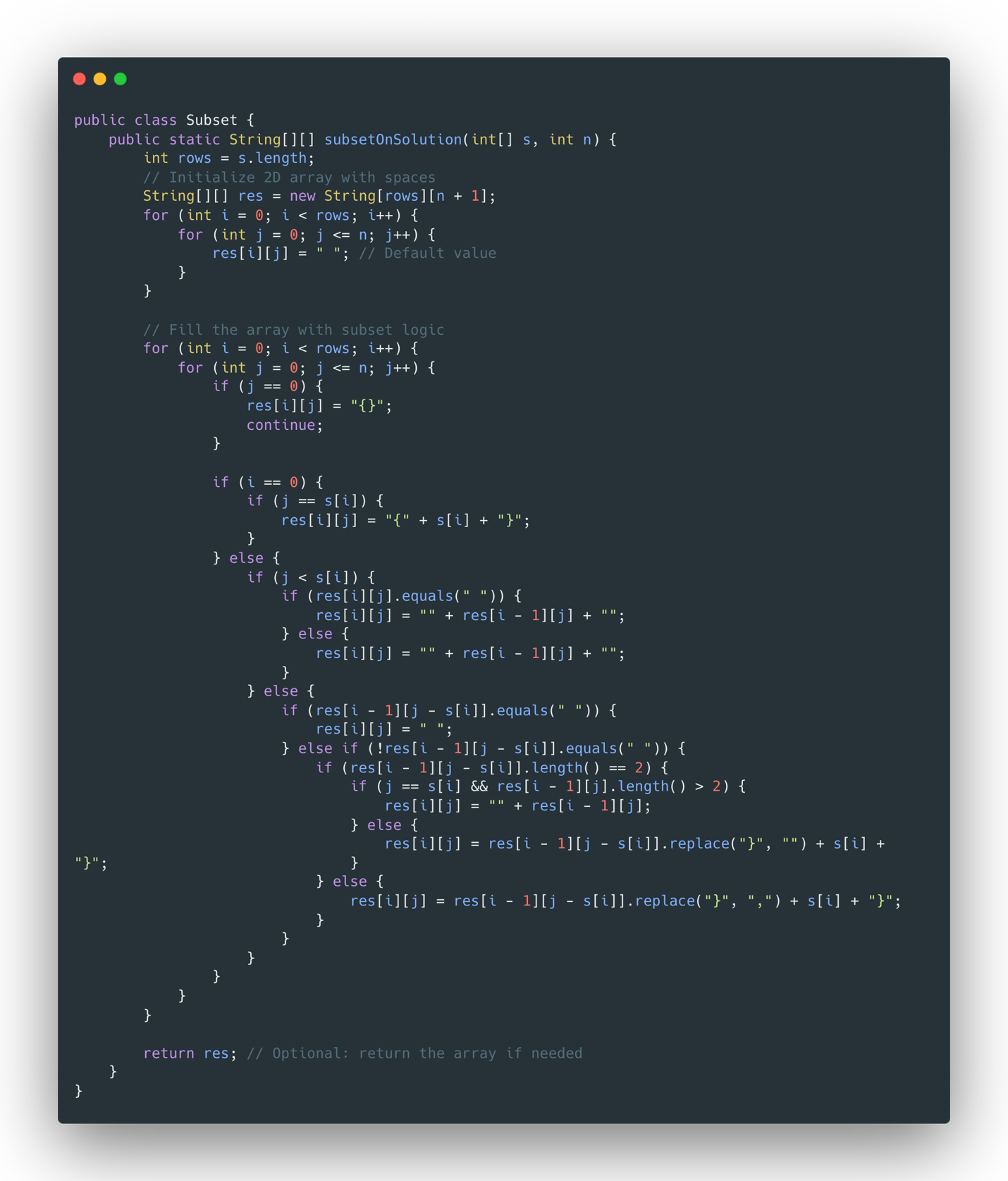
**QUESTION 1.**

**Write a Java program to solve the subset problem.**

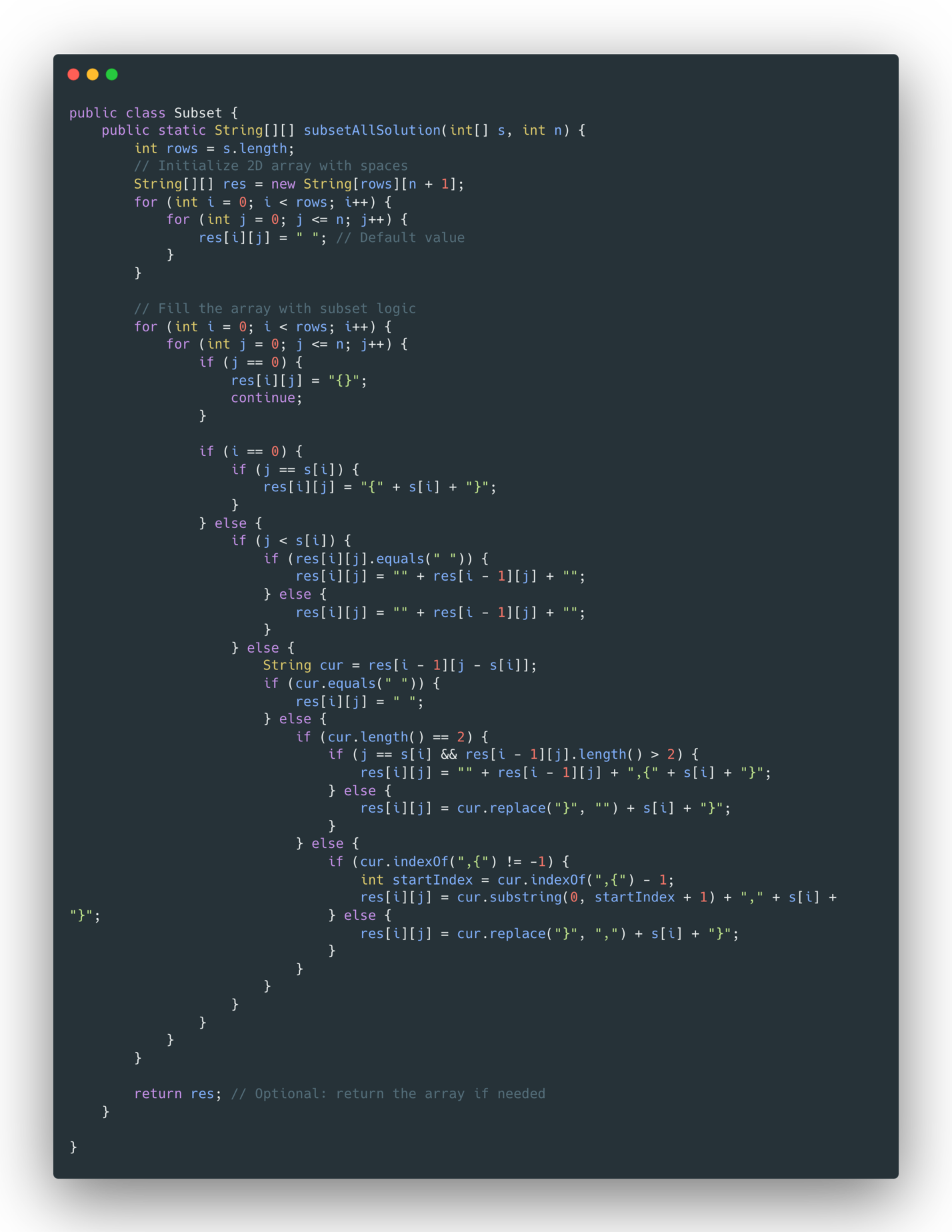
1. **T or F.**

****

1. **One solution.**

****

1. **All solutions.**

****

**QUESTION 2.**

**Solve subset problem where S = {3, 4, 7, 8} and k = 15.**

1. **T or F.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 3 | T |  |  | T |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 | T |  |  | T | T |  |  | T |  |  |  |  |  |  |  |  |
| 7 | T |  |  | T | T |  |  | T |  |  | T | T |  |  | T |  |
| 8 | T |  |  | T | T |  |  | T | T |  |  | T | T |  |  | T |

1. **One solution.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 3 | {} |  |  | {3} |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 | {} |  |  | {3} | {4} |  |  | {3,4} |  |  |  |  |  |  |  |  |
| 7 | {} |  |  | {3} | {4} |  |  | {3,4} |  |  | {3,7} | {4,7} |  |  | {3,4,7} |  |
| 8 | {} |  |  | {3} | {4} |  |  | {3,4} | {8} |  |  | {4,7} | {4,8} |  |  | {3,4,8) |

1. **All solutions.**

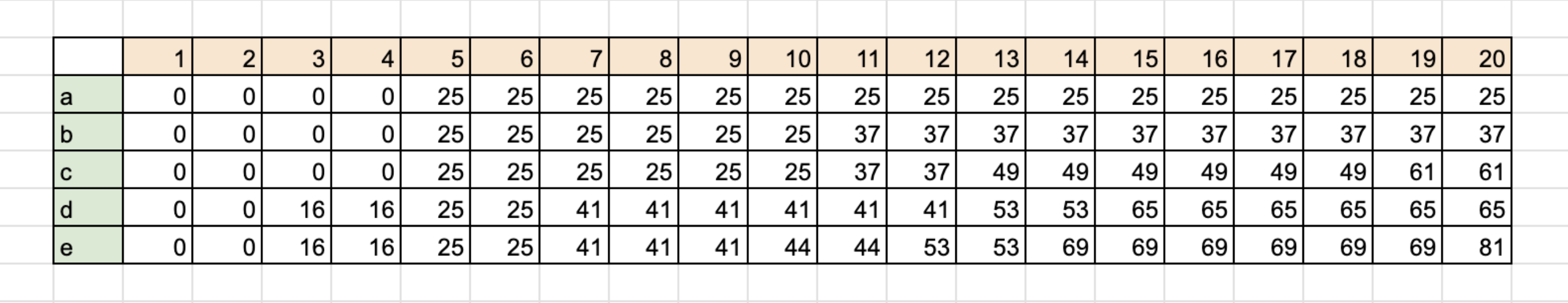
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 3 | {} |  |  | {3} |  |  |  |  |  |  |  |  |  |  |  |  |
| 4 | {} |  |  | {3} | {4} |  |  | {3,4} |  |  |  |  |  |  |  |  |
| 7 | {} |  |  | {3} | {4} |  |  | {3,4},{7} |  |  | {3,7} | {4,7} |  |  | {3,4,7} |  |
| 8 | {} |  |  | {3} | {4} |  |  | {3,4},{7} | {8} |  |  | {4,7} | {4,8} |  |  | {3,4,8) |

**QUESTION 3**

**Solve the integer Knapsack problem given below:**

***The maximum allowable total weight in the knapsack is Wmax = 20.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Item** | **a** | **b** | **c** | **d** | **e** |
| **value** | **25** | **12** | **24** | **16** | **28** |
| **Weight** | **5** | **6** | **8** | **2** | **7** |

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**QUESTION 4. Solve the fractional Knapsack problem given below:**

***The maximum allowable total weight in the knapsack is Wmax = 20.***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Item** | **a** | **b** | **c** | **d** | **e** |
| **value** | **25** | **12** | **24** | **16** | **28** |
| **Weight** | **5** | **6** | **8** | **2** | **7** |

**Total weight: 20**

**Max value approach: e + a + c = 28 + 25 + 24 = 77**

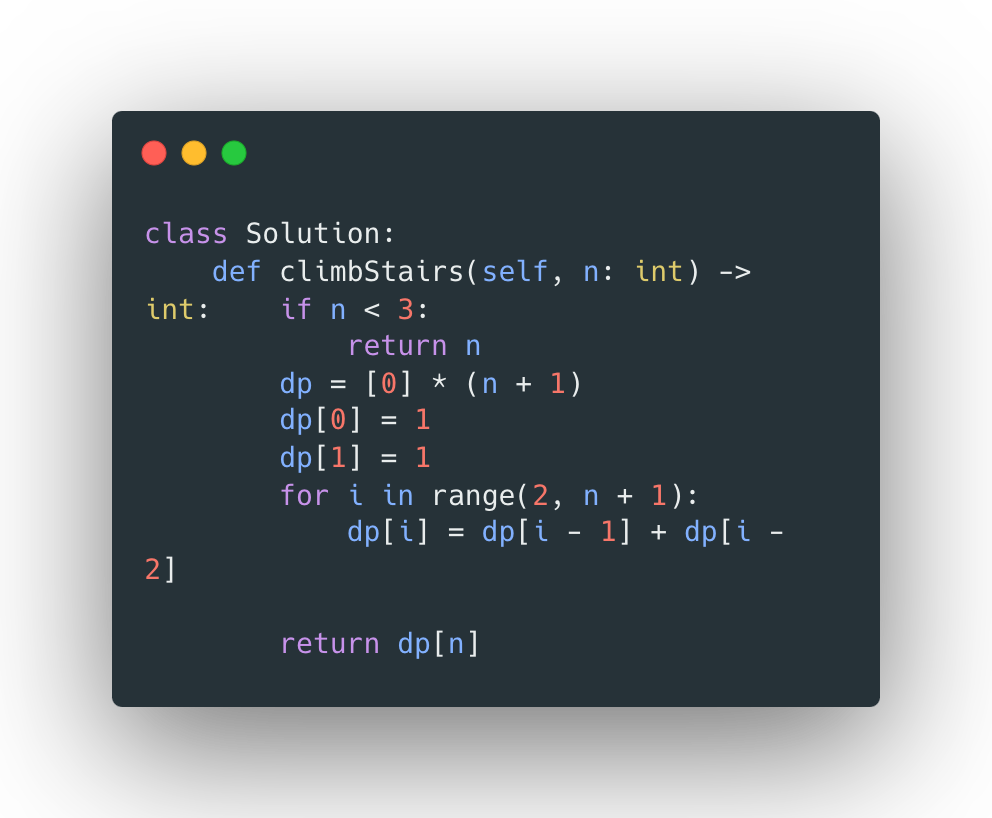
**Min weight approach: d + a + b + e = 2 + 5 + 6 + 7 = 20**

**Value per weight: a: 5, b: 2, c: 3, d: 8, e: 4**

**Select: d a e 0.75c = 16 + 25 + 28 + 18 = 87**

**QUESTION 5.**

[**https://leetcode.com/problems/climbing-stairs/description/**](https://leetcode.com/problems/climbing-stairs/description/)

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**QUESTION 6.**

[**https://leetcode.com/problems/house-robber/description/**](https://leetcode.com/problems/house-robber/description/)

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