SGPA or CGPA is calculated by multiplying Grade Points of each subject with the credit hours of that subject and then taking sum and average for all subjects together.

First step will be to calculate GP of a subject when marks are known. Here are few hints to get the GP.

|  |  |  |
| --- | --- | --- |
| **Marks in subject** | **Grade Points** | **Add points for each higher step** |
| >= 90 | 4.00 | 0 |
| 86 – 89 | 4.00 | 0.33 |
| 82 – 85 | 3.67 | 0.34 |
| 78 – 81 | 3.33 | 0.33 |
| 74 – 77 | 3.00 | 0.33 |
| 70 – 73 | 2.67 | 0.34 |
| 66 – 69 | 2.33 | 0.33 |
| 62 – 65 | 2.00 | 0.33 |
| 58 – 61 | 1.67 | 0.34 |
| 54 – 57 | 1.33 | 0.33 |
| 50 – 53 | 1.00 | 1 |
| <= 49 | 0 | 0 |

**HINT 1: How to calculate GP if student gets 64 marks (without if statement, logical/relational operators)**

For marks less than or equal to 49 -> GP in that subject 0

For marks mor than 49 -> GP to be added is (1\*true) -> Total GP in that subject = 1.00

For marks more than 54 -> GP to be added is (0.33\*true) -> Total GP in that subject = 1.00 + 0.33 = 1.33

For marks more than 58 -> GP to be added is (0.34\*true) -> Total GP in that subject = 1.33 + 0.34 = 1.67

For marks more than 62 -> GP to be added is (0.33\*true) -> Total GP in that subject = 1.67 + 0.33 = 2.00

For marks more than 66 -> GP to be added is (0.33\*false because marks:64 are NOT more than 66) -> Total GP in that subject = 2.00 + 0 = 2.00

**and so on...**

**HINT 2: How we can check that a number is greater than a given value**

If we want to check whether 78 is less or greater than 74, we can do 78/74. If result is 0 then the given number 78 is less than the value 74 that we want to check; otherwise, a non-zero value (quotient) is produced.

78 / 74 = 1 (78 is greater than 74)

78 / 82 = 0 (78 is less than 82)

Of course, we can also use relational operators as well like 78>74 to get true or false.