Python ints do not have a limit

Suppose your memory model allows 2 bit ints.

$$\begin{array}{ll} 0\,0 & \leftarrow 0 \\ 0\,1 & \leftarrow 1 \\ 1\,0 & \leftarrow 2 \\ 1\,1 & \leftarrow 3 \end{array}\Bigg\}$$ giving more bits than 2 results in overflow

forgot any bit more than 2 places

$7 = (111)_2 \longrightarrow (11)_2 = 3$

If result doesn't fit in 32 bit in C program you get incorrect result. (Keep this in mind).

Converting bin to dec :-

an n-bit binary number $(a_{n-1}\, a_{n-2} \ldots\ldots a_0)_2$

To convert to decimal :-

$$d = \sum_{i=0}^{n-1} a_i \, 2^i$$

$$\begin{array}{ccccc} 1 & & 0 & & 1 \\ \times & + & \times & + & \times \\ 2^2 & & 2^1 & & 2^0 \end{array} \longrightarrow 5$$

Another way without computing powers of 2.

input ; 101 ;

$\underrightarrow{1}$ $\quad d = 0$

most significant bit first

$d = 2*d + 1 \leftarrow a_n$

$= 1 \quad \} \; (1)_2$

$\rightarrow 0$

$d = 2*d + 0$

$= 2 \quad \} \; (10)_2$

$\rightarrow \underline{1}$

units place

$d = 2*d + \underline{1} \leftarrow a_0$

$= 2*2 + 1 \quad \} \; (101)_2$

$= 5$

Recall the formula :

$$d = \sum_{i=0}^{n-1} a_i \, 2^i$$

$$d = (((2 * a_{n-1} + a_{n-2}) * 2 + a_{n-3})) * 2 + \ldots$$

$n = 3$. ; $(a_2 a_1 a_0)_2$

in dec $= 2^2 a_2 + 2a_1 + a_0$

$= 2(2a_2 + a_1) + a_0$

$$2 \underbrace{(2d + a_1)}_{d} + a_0$$