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$$\begin{array}{ccccccc} 1 & 9 & 5 & 9 & 12 & 9 & 22 \\ & \nearrow & & \nearrow & & \nearrow & \\ & +4 & & +4 & & +10 & \\ & & \nearrow & & \nearrow & & \\ & & +3 & & +3 & & \end{array}$$

$$a_n = an^2 + bn + c$$

$$a_n = \frac{1}{2}n^2 - \frac{1}{2}n \quad \frac{1}{2}(1) = 5$$

$$a_{10} = \frac{1}{2} \times 100 - 50 = 100 - 50 = 50 \quad (15)$$

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$$\begin{array}{ccccccc} 0 & 9 & 1 & 9 & 3 & 9 & 6 \\ & \nearrow & & \nearrow & & \nearrow & \\ & +1 & & +2 & & +3 & \\ & & \nearrow & & \nearrow & & \\ & & +1 & & +1 & & \end{array}$$

~~$$a_n = \frac{1}{2}n^2 - \frac{1}{2}n$$~~

$$\begin{aligned} a_1 &= a + b + c = \frac{1}{2} + b + c = 0 \\ a_2 &= 4a + 2b + c = 2 + 2b + c = 1 \\ &\Rightarrow b = -\frac{1}{2} \end{aligned}$$

$$a_n = \frac{1}{2}n^2 - \frac{1}{2}n = \frac{n(n-1)}{2}$$

$$a_n = \frac{n(n-1)}{2} = 55 \Rightarrow n=11 \quad \text{در جمله یازدهم}$$

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مهره های رنگی $\rightarrow 5, 9, 13, 17, \dots$

$$a_n = 4n + 1$$

$$\left. \begin{aligned} &\Rightarrow a_{11} = 45 \\ &\text{if } n=11 \end{aligned} \right\} \Rightarrow a_{11} = 40$$

مهره های سفید $\rightarrow 0, 4, 8, 12, \dots$

$$a_n = 4n - 4$$

(۲)

مهره های رنگی = 45

مهره های سفید = 40

مجموع = 45 + 40 = 85

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$$a_n = \frac{(-1)^n}{n}$$

$$\frac{1}{2} - (-1) = \frac{3}{2}$$

بزرگترین = $a_2 = \frac{(-1)^2}{2} = \frac{1}{2}$

کوچکترین = $a_1 = \frac{(-1)^1}{1} = -1$

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$$b_n = (-r)^n - vn \Rightarrow b_r = (-r)^r - (v \times r) = -rA$$

$$a_n = -an + r \quad \& \quad a_k = -ak + r = -rA \Rightarrow ak = v$$

$$\Rightarrow k = 1r$$

$$\frac{t_m - t_n}{m - n} = d \Rightarrow \frac{t_{10} - t_v}{10 - v} = \frac{1r}{r} = r = d$$

$$t_3 = t_1 + ad \Rightarrow t_3 - t_1 = t_1 + ad - t_1 = ad = r$$

$$a_r = v$$

$$\frac{a_r - a_v}{r - v} = \frac{A}{r} = r = d$$

$$a_r = a_1 + r \Rightarrow a_1 = r$$

$$a_r = a_1 + rd \Rightarrow ar = 11$$

$$b_n = an + b$$

$$b_1 = r$$

$$d = 1$$

$$br = 11$$

$$b_n = 1n - 1$$

$$t_n = \frac{r(n-r)}{r(n+r)}$$

$$\frac{r(n-r)}{r(n+r)} > \frac{r}{r} \Rightarrow n \leq 4$$

$$t_3 = \frac{r}{10} < \frac{r}{r}$$

$$t_v = \frac{r}{1v} > \frac{r}{r}$$

$$\begin{matrix} 9 & 9 & 9 & 9 & 9 \\ \rightarrow & \rightarrow & \rightarrow & \rightarrow & \rightarrow \\ +r & +0 & -r & & \\ \rightarrow & \rightarrow & \rightarrow & & \\ -r & -r & & & \end{matrix}$$

$$1/0$$

$$t_n = An^r + Bn$$

$$A = -\frac{r}{r}$$

$$\begin{cases} t_1 = -\frac{r}{r} + B = 9 \\ t_r = -r + rB = 9 \end{cases}$$

$$\Rightarrow B = 1/0 \Rightarrow t_n = -\frac{r}{r}n^r + 1/0n$$

$$t_n = -9 - 1/0$$

$$t_n = an^r + bn + c$$

$$a = 1 \quad c = -9$$

$$b = -1 \Rightarrow t_n = n^r - n - 9$$

$$t_1 = 1 + b + c = -9$$

$$t_r = r + rb + c = -r$$

$$b = -1$$

$$\& \quad c = -9$$

$$\frac{t_r - t_v}{r - v} = \frac{10}{r} = d$$

$$t_r = t_1 + ad = r \Rightarrow t_1 = r$$

$$t_n = an^r + 1$$

$$n^r - n - 9 = an + 1$$

$$\Rightarrow n^r - 9n = 10 \Rightarrow n = 9$$