# W T P survey price change

Let $x_0$ be the initial celling price of the selected beverage and $p$ be the proportion at which the price changes. In our case $p$ is 0.5 if price ($x_0$) less than or equal to 4 $SAR$ and 0.25 if price is more than 4 $SAR$. If $i$, $(i = 1, 2, ..., 10)$ represent the index of each repetition, then the price for $i^{th}$ repetition is given by the formula.

$$x_i = x_0 + (2^{i-1} \times p \times x_0)$$

and if the subject respond $'NO'$ to the $k^{th}$ bid value for $k > 2$ then to get the price more closer the algorithm will reset the $x_0$ as $x_k - 1$ and restart the process form $i = 1, 2, ..., (k-1)$ and this will continue until we get 'NO' for $i < 3$

### Example

Assume that the subject select a drink with price = 4 $SAR$, then we will have the value of $x_0 = 4$. Since the value is less than or equal to 4, $p$ will take value 0.5. Then the first $(i = 1)$ willingness to pay question will ask the subject that whether he is willing to buy the product for the price $x_1$, which is,

$$x_1 = 4 + (2^{1-1} \times 0.5 \times 4) = 6SAR$$

if the subject is willing to purchase the product then the next bid will be for $i = 2$ which is,

$$x_2 = 4 + (2^{2-1} \times 0.5 \times 4) = 8SAR$$

The algorithm continues unless the subject say that he is not willing to purchase or the index $i$ reaches its maximum of 10.

Now assume that the subject responded $'NO'$ for the $4^{th}$ bid that is for the price $20SAR$, then we have the assumption that price is between 12 ($i = 3$) and 20 ($i = k = 4$). The algorithm reset the $x_0$ as 12 and restart the iteration.

Hence the next bid value will be,

$$x_1 = 12 + (2^{1-1} \times 0.5 \times 4) = 14SAR$$

if 'YES' then $i = 2$,

$$x_2 = 12 + (2^{2-1} \times 0.5 \times 4) = 16SAR$$

if 'YES' then $i = 3$, we know that the next value is again $20SAR$ which was responded as $'NO'$, so we need to reset, $x_0$ as 16 and restart the process from $i = 1$.

The result will be,

$$x_1 = 16 + (2^{1-1} \times 0.5 \times 4) = 18SAR$$

if answer is $'Yes'$ then store the value 18 and if it is $'No'$ then store value $x_0 = 16SAR$ since the subject respond $'NO'$ to the $k^{th}$ bid value while $k < 3$.