111	011	5
	111	3
		7

The basic computation in the DIT FFT algorithm is illustrated in Fig. 6.9, which is called a butterfly because the shape of its flow graph resembles a butterfly.

The symmetry and periodicity of W_N^r can be exploited to obtain further reductions in computation. The multiplications by $W_N^0 = 1$, $W_N^{N/2} = -1$, $W_N^{N/4} = j$ and $W_N^{3N/2} = -j$ can be avoided in the DFT computation process in order to save the computational complexity.

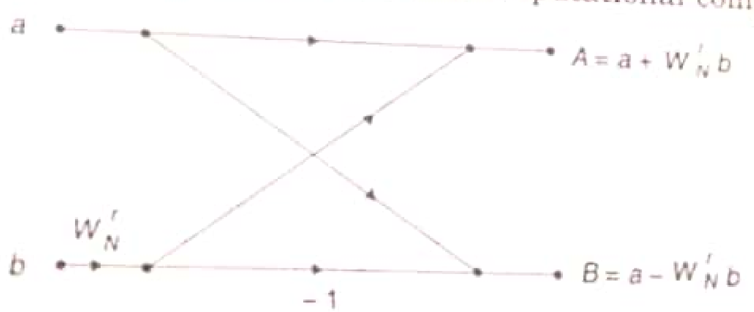

Fig. 6.9 *Basic Butterfly Flow Graph for the Computation in the DIT FFT Algorithm*

In the 8-point DIT FFT flow graph shown in Fig. 6.8, W_2^0, W_2^4 and W_2^8 are equal to 1, and hence these scale factors do not actually represent complex multiplications. Also, since W_2^0, W_2^4, and W_2^8 equal to −1, they do not represent a complex multiplication, where there is just a change in sign. Further, W_1^4, W_3^4, W_2^8 and W_8^6 are j or $-j$, they need only sign changes and interchanges of real and imaginary parts, even though they