```
In[117]:= (*This part cannot be modified.*)

AC := {{N0 = Sum[If[α[j] == β[j], 1, 0], {j, 1, n}], NE0 = Sum[If[And[α[j] == β[j], A[j] == B[j]], 1, 0], {j, 1, n}]};
    If[NE0 > 0, N[100 - 100 * NE0 / N0] "% Anti-correlation only.  Model fails to
       describe anti-correlation when Alice and Bob happen to measure with the same angle.",
     "Anti-correlation at equal angles OK."]};

BellT := {{NU1 = Sum[If[And[β[j] - α[j] == -π/8, A[j] ≠ B[j]], 1, 0], {j, 1, n}],

    NE2 = Sum[If[And[β[j] == π/4, A[j] == B[j]], 1, 0], {j, 1, n}], NU3 = Sum[If[And[β[j] - α[j] == -3 π/8, A[j] ≠ B[j]], 1, 0], {j, 1, n}]},
   "The Bell inequality predicts that the first number is smaller than the sum of the second and third numbers.
    It holds in all directly real models (local realism).
    On principle, all directly real models can be realized by modifying this computer realization.",
   If[NU3 + NE2 < NU1, "Bell's inequality is violated! Please play again.
    QM violates Bell's inequality roughly 99 times of 100 (assuming 800 photon pairs per trial).",
    "QM violates the Bell inequality 99 times out of 100
      runs (assuming 800 photon pairs per run), which excludes directly real models."]};

CHSH := {{N3 = Sum[If[β[j] - α[j] == -3 π/8, 1, 0], {j, 1, n}], NE3 = Sum[If[And[β[j] - α[j] == -3 π/8, A[j] == B[j]], 1, 0], {j, 1, n}],

    N1 = Sum[If[β[j] - α[j] == -3 π/8, 1, 0], {j, 1, n}], NE1 = Sum[If[And[β[j] - α[j] == -3 π/8, A[j] == B[j]], 1, 0], {j, 1, n}], N2 = Sum[If[β[j] - α[j] == π/4, 1, 0], {j, 1, n}],

    E0 = 2 NE0/N0 - 1, E1 = 2 NE1/N1 - 1, E2 = 2 NE2/N2 - 1, E3 = 2 NE3/N3 - 1};
   CHV = N[Max[Abs[E0 + E1 + E2 - E3], Abs[E0 + E1 - E2 + E3], Abs[E0 - E1 + E2 + E3], Abs[E1 + E2 + E3 - E0]]],
   If[CHV > 2, "CHSH inequality is violated!", "CHSH inequality is not violated."]};
n = 800;
(*Random angeles and random outcomes.*)
Table[α[j] = If[Random[] < 0.5, 0, 3] (π / 8), {j, n}];
Table[A[j] = If[Random[] < 0.5, 0, 1], {j, n}];

(*Random angles also for Bob, but Bob's outcomes stay undertermined relative to Alice.*)
Table[β[j] = If[Random[] < 0.5, 0, 2] (π / 8), {j, n}];

(*Bob's outcomes are correlated with Alice'sangles.*)
```

```
Table[B[j] = If[Random[] < (Sin[β[j] - α[j]])^2, A[j], 1 - A[j]], {j, n}];

AC
MatrixForm[BellT]
CHSH
Clear[A, B, α, β]
```

Out[125]= {Anti-correlation at equal angles OK.}

Out[126]//MatrixForm=

```
{172, 133, 32}
The Bell inequality predicts that the first number is smaller than the sum of the second and third numbers.
It holds in all directly real models (local realism).
On principle, all directly real models can be realized by modifying this computer realization.
Bell's inequality is violated! Please play again.
QM violates Bell's inequality roughly 99 times of 100 (assuming 800 photon pairs per trial).
```

Out[127]= {2.64368, CHSH inequality is violated!}