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Pawn-Duo, (Phalanx) ^[1]

two adjacent [pawns](#) of the same [color](#) on the same [rank](#) that mutually cover the other's [stop square](#). A **Trio** are three horizontal friendly pawns, a **Quart** four horizontal friendly pawns.

*Working in the **bitboard centric** world to determine pawn related pattern set-wise.*

The code snippets rely on [shifting bitboards](#), specially by [one step only](#).

Neighbors

To get pawns with east or west neighbors is simple:

```
U64 pawnsWithEastNeighbors(U64 pawns) {  
    return pawns & westOne (pawns);  
}
```

```
U64 pawnsWithWestNeighbors(U64 pawns) {  
    return pawnsWithEastNeighbors(pawns) << 1; // * 2  
}
```

or

```
U64 pawnsWithWestNeighbors(U64 pawns) {
    return pawns & eastOne (pawns);
}

U64 pawnsWithEastNeighbors(U64 pawns) {
    return pawnsWithWestNeighbors(pawns) >> 1;
}
```

pawns east eighbors	pawns with east neighbors	pawns with west neighbors	pawns with and west n
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Neighbor Algebra

Pawns with east or west neighbors are at least member of a duo. Pawns with east and west neighbors at least member of a trio. If two neighbors have both east and west neighbors, it is at least a quart.

An exclusive pawn duo is therefor a pawn with one neighbor, while this neighbor has no other neighbor as well.

```
U64 duo (U64 pawns) {
    U64 withWestNeighbors = pawnsWithWestNeighbors(pawns);
    U64 withEastNeighbors = withWestNeighbors >> 1;

    U64 withOneExclusiveNeighbor =
```

```
withWestNeighbors ^ withEastNeighbors;
    U64 withExclusiveWestNeighbor =
withWestNeighbors & withOneExclusiveNeighbor;
    U64 withExclusiveEastNeighbor =
withEastNeighbors & withOneExclusiveNeighbor;

    U64 duoWestOne =
withEclusiveEastNeighbor & (withEclusiveWestNeighbor >> 1);
    U64 duoEastOne = duoWestOne << 1;
    return duoWestOne | duoEastOne;
}
```

pawns	pawns with excl. east neighbor	pawns with excl. west neighbor	duo
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1 1
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See also

- [Stop Square](#)
- [Hanging Pawns](#)
- [Pawn Islands \(Bitboards\)](#)
- [Phalanx](#) (Engine)

Forum Posts

- [The phalanx concept](#) by [Lyudmil Tsvetkov](#), [CCC](#), May 21, 2014

External Links

- [Pawn Structure \(General\) | Page 5 of 5 | Phalanx Formation](#)
- [Duet from Wikipedia](#)
- [Phalanx from Wikipedia](#)
- [Trio from Wikipedia](#)
- [Kinga Głȳk Trio](#) - Walking Baby, [VisionInMusica](#), [Terni](#), March 10, 2017, [YouTube](#) Video
[Kinga Głȳk](#), [Irek Głȳk](#), [Rafal Stepień](#)
- [Quart \(disambiguation\) from Wikipedia](#)
- [Panta Rhei](#) plays [Bartók's](#) Quarts, 1977, [YouTube](#) Video

References

1. [^ Pawn Structure \(General\) | Page 5 of 5 | Phalanx Formation](#)

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