

```

FindNeighbours[IList_, JList_, Start_, nextI_, nextJ_, ConvexHull_] :=
Module[{SortedPointsKeys = <| |>, SortedPoints = {}, proportionJ,
|Modul
    proportionI, jtemp, itemp, PotNextJDir, distanceNextPotPointJ, PotNextIDir,
    distanceNextPotPointI, NeighbourNumberJ, NeighbourNumberI, distanceJ,
    distanceI, NextJDir, NextIDir, StartPropJForFirstCompleteGridJ},

    Print["
    |gib aus

Detect I and J rows of
    |imaginäre Einheit I
    Points_-----

"];
Clear[CheckPoints];
|lösche
CheckPoints = {};
StartPoint = Start;
StartPointI = Start;
StartPointJ = Start;
NextPointI = nextI;
NextPointJ = nextJ;

Print["Start = ", Start];
|gib aus
Print[" nextI = ", nextI];
|gib aus
Print["nextJ = ", nextJ];
|gib aus
IDirStart = {nextI[CoordI] - Start[CoordI], nextI[CoordJ] - Start[CoordJ]};
JDirStart = {nextJ[CoordI] - Start[CoordI], nextJ[CoordJ] - Start[CoordJ]};

Print["IDir = ", IDirStart];
|gib aus
Print["JDir = ", JDirStart];
|gib aus
StartProportionI = nextI[CoordJ] - Start[CoordJ];
StartProportionJ = nextJ[CoordI] - Start[CoordI];

StartDistanceI = Sqrt[Abs[IDirStart[[1]]^2 + IDirStart[[2]]^2]];
|Qua·· |Absolutwert
StartDistanceJ = Sqrt[Abs[JDirStart[[1]]^2 + JDirStart[[2]]^2]];
|Qua·· |Absolutwert

AssociateTo[StartPoint, {NeighbourJ → 1, NeighbourI → 1}];
|assoziiere mit
AssociateTo[NextPointI, {NeighbourJ → 1, NeighbourI → 2}];
|assoziiere mit
AssociateTo[NextPointJ, {NeighbourJ → 2, NeighbourI → 1}];
|assoziiere mit
AppendTo[SortedPoints, {StartPoint, NextPointI, NextPointJ}];
|hänge an bei

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AppendTo[CheckPoints, Start];
|hänge an bei
AppendTo[CheckPoints, nextJ];
|hänge an bei
AppendTo[CheckPoints, nextI];
|hänge an bei

NeighbourNumberJ = 2;
NeighbourNumberI = 2;
aI = 2;
aJ = 2;
NextJDir = JDirStart;
distanceJ = StartDistanceJ;

proportionJ = StartProportionJ;
StartPropJForFirstCompleteGridJ = StartProportionJ;

For[pp = 1, pp ≤ Length[JList] * 2, pp++,
|For-Schleife |Länge
  For[tt = 1, tt ≤ Length[JList], tt++,
|For-Schleife |Länge
    If[JList[[tt]][CoordJ] ≠ StartPointJ[CoordJ] &&
|wenn
      JList[[tt]][CoordJ] ≥ NextPointJ[CoordJ] && JList[[tt]][CoordI] ≥
      NextPointJ[CoordI] || JList[[tt]][CoordI] ≤ NextPointJ[CoordI],

      PotNextJDir = {JList[[tt]][CoordJ] - NextPointJ[CoordJ],
        JList[[tt]][CoordI] - NextPointJ[CoordI]};
      distanceNextPotPointJ = Sqrt[Abs[PotNextJDir[[1]]^2 + PotNextJDir[[2]]^2]];
|Qua... |Absolutwert
    ];

    If[JList[[tt]][CoordJ] ≠ NextPointJ[CoordJ] &&
|wenn
      JList[[tt]][CoordJ] ≠ StartPointJ[CoordJ] &&
      (JList[[tt]][CoordI] ≤ NextPointJ[CoordI] + proportionJ + 0.3 &&
      (JList[[tt]][CoordI] ≥ NextPointJ[CoordI] + proportionJ - 0.3 &&
      distanceNextPotPointJ ≤ (distanceJ + 0.5) &&
      JList[[tt]][CoordJ] ≥ NextPointJ[CoordJ] + (distanceJ / 2),

      StartPointJ = NextPointJ;
      NextPointJ = JList[[tt]];

      Print["Test J = ", JList[[tt]]];
|gib aus

      NextJDir = {NextPointJ[CoordJ] - StartPointJ[CoordJ],
        NextPointJ[CoordI] - StartPointJ[CoordI]};
      distanceJ = Sqrt[Abs[NextJDir[[1]]^2 + NextJDir[[2]]^2]];
|Qua... |Absolutwert
      proportionJ = NextPointJ[CoordI] - StartPointJ[CoordI];
      aJ = aJ + 1;
      AppendTo[CheckPoints, JList[[tt]]];
|hänge an bei

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NextIDir = {NextPointI[CoordJ] - StartPointI[CoordJ],
  NextPointI[CoordI] - StartPointI[CoordI]};
distanceI = Sqrt[Abs[NextIDir[[1]]^2 + NextIDir[[2]]^2]];
           [Qua... [Absolutwert]

proportionI = NextPointI[CoordJ] - StartPointI[CoordJ];
(*propJForGrind = Abs[NextPointI[CoordJ] - StartPointI[CoordI]];*)
           [Absolutwert]
propJForGrind = Abs[StartProportionJ];
           [Absolutwert]

aI = aI + 1;

AppendTo[CheckPoints, IList[[tt]]];
[hänge an bei]
AssociateTo[SortedPointsKeys,
[assoziere mit]
  {Ilist[[tt]], NeighbourJ → 1, NeighbourI → aI}];
AppendTo[SortedPoints, SortedPointsKeys];
[hänge an bei]

LastIPointsCellJ = IList[[tt]][CellJ];
CheckLastPointI = IList[[tt]];
AssociateTo[CheckLastPointI, {NeighbourJ → 1, NeighbourI → aI}];
[assoziere mit]

NeighbourNumberJ = NeighbourNumberJ;
AppendTo[SortedPoints, SaftyListI[Start, CheckLastPointI,
[hänge an bei]
  proportionI, LastIPointsCellJ, ConvexHull, distanceI, NextIDir]];

AppendTo[SortedPoints, CompleteJGrid[Ilist[[tt]],
[hänge an bei]
  ConvexHull, distanceJ, propJForGrind, Start, NeighbourNumberJ, aI]];

];
];
];

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Print["Länge ConvexHull = ", Length[ConvexHull]];
[gib aus] [Länge]
Print["Länge SortedPoints = ", Length[Flatten[SortedPoints]]];
[gib aus] [Länge] [ebne ein]
If[Length[Flatten[SortedPoints]] ≠ Length[ConvexHull] && splits ≤ 8,
[... [Länge] [ebne ein] [Länge]
  splits = splits + 1;
  Clear[CheckPoints];
  [lösche]
  CheckPoints = {};
  Print["
[gib aus]

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Another

round\_\_\_\_\_

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"];
  FindMinMax[PointList],
  Print["
    gib aus
End and
    beende Kontext
    Result _____

"];
  Print["SortedPoints = ", Flatten[SortedPoints]];
  gib aus      lebne ein
  DrawGraph[SortedPoints];
  splits = 2;
];
];

SaftyListJ[Start_, CheckLastPointJ_, proportionJ_,
  LastJPointsCellI_, ConvexHull_, distanceJ_, NextJDir_] :=
Module[{SaftyList = {}, SaftyKeys = <||>, SaftyKeysList = {}},
  Modul
    propJ, lastDirJ, lastdistanceJ, PotNextJDir, tempj,
    distanceNextPotPointJ, nextNeighbourNumber, StartAtThisJPoint},

  If[Length[SaftyKeysList] ≠ 0,
    ... Länge
    Clear[SaftyKeysList];
    lösche
  ];
  StartAtThisJPoint = CheckLastPointJ;
  nextNeighbourNumber = CheckLastPointJ[NeighbourJ] + 1;
  propJ = proportionJ;
  lastDirJ = NextJDir;
  lastdistanceJ = distanceJ;

  For[ii = 1, ii ≤ Length[ConvexHull], ii++,
    For-Schleife      Länge
      If[ConvexHull[[ii]][CellI] == CheckLastPointJ[CellI] + 1 ||
        wenn
          ConvexHull[[ii]][CellI] == CheckLastPointJ[CellI] - 1 ||
          ConvexHull[[ii]][CellI] == CheckLastPointJ[CellI] &&
            ConvexHull[[ii]][CellJ] ≥ CheckLastPointJ[CellJ],

            AppendTo[SaftyList, ConvexHull[[ii]]];
            hänge an bei
          ];
    ];

  Print["SaftyList J = ", SaftyList];
  gib aus

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gib aus
For[ll = 1, ll ≤ Length[SafetyList], ll++,
  For-Schleife    Länge
  If[SafetyList[[ll]][CoordJ] ≠ Start[CoordJ] &&
    wenn
      SafetyList[[ll]][CoordJ] ≥ StartAtThisJPoint[CoordJ] &&
      SafetyList[[ll]][CoordI] ≥ StartAtThisJPoint[CoordI] ||
      SafetyList[[ll]][CoordI] ≤ StartAtThisJPoint[CoordI],

      PotNextJDir = {StartAtThisJPoint[CoordJ] - SafetyList[[ll]][CoordJ],
        StartAtThisJPoint[CoordI] - SafetyList[[ll]][CoordI]};
      distanceNextPotPointJ = Sqrt[Abs[PotNextJDir[[1]]^2 + PotNextJDir[[2]]^2]];
                                Qua·· Absolutwert
  ];
  If[SafetyList[[ll]][CoordJ] ≠ Start[CoordJ] &&
    wenn
      SafetyList[[ll]][CoordJ] ≠ StartAtThisJPoint[CoordJ] &&
      SafetyList[[ll]][CoordJ] ≥ StartAtThisJPoint[CoordJ] &&
      SafetyList[[ll]][CoordI] ≤ StartAtThisJPoint[CoordI] + propJ + 0.3 &&
      SafetyList[[ll]][CoordI] ≥ StartAtThisJPoint[CoordI] + propJ - 0.3 &&
      distanceNextPotPointJ ≤ lastdistanceJ + 0.5 &&
      SafetyList[[ll]][CoordJ] ≥ StartAtThisJPoint[CoordJ] + lastdistanceJ / 3
      (** (3/4) *) && MemberQ[CheckPoints, SafetyList[[ll]]] == False,
                                Lenthalten? falsch
      Print["SafetyListPoint = ", SafetyList[[ll]]];
      gib aus
      AppendTo[CheckPoints, SafetyList[[ll]]];
      hänge an bei
      AssociateTo[SafetyKeys, { SafetyList[[ll]],
        NeighbourJ → nextNeighbourNumber, NeighbourI → CheckLastPointJ[NeighbourI] }];
      AppendTo[SafetyKeysList, SafetyKeys];
      hänge an bei

      lastDirJ = {StartAtThisJPoint[CoordJ] - SafetyList[[ll]][CoordJ],
        StartAtThisJPoint[CoordI] - SafetyList[[ll]][CoordI]};
      lastdistanceJ = Sqrt[Abs[lastDirJ[[1]]^2 + lastDirJ[[2]]^2]];
                                Qua·· Absolutwert
      propJ = SafetyList[[ll]][CoordI] - StartAtThisJPoint[CoordI];

      StartAtThisJPoint = SafetyList[[ll]];
      Print["StartAtThisJPoint = ", StartAtThisJPoint];
      gib aus
      nextNeighbourNumber = nextNeighbourNumber + 1;

  For[ii = 1, ii ≤ Length[ConvexHull], ii++,
    For-Schleife    Länge
    If[ConvexHull[[ii]][CellI] == StartAtThisJPoint[CellI] + 1 ||
      wenn
        ConvexHull[[ii]][CellI] == StartAtThisJPoint[CellI] - 1 ||
        ConvexHull[[ii]][CellI] == StartAtThisJPoint[CellI] &&
        ConvexHull[[ii]][CellJ] ≥ StartAtThisJPoint[CellJ],

        AppendTo[SafetyList, ConvexHull[[ii]]];
        hänge an bei

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    ];
  ];
];
];

Clear[SafetyList];
lösche
Return[SafetyKeysList];
gib zurück
];

SafetyListI[Start_, CheckLastPointI_, proportionI_,
  CheckCellJForI_, ConvexHull_, distanceI_, NextIDir_] :=
Module[{SafetyList = {}, SafetyKeys = <||>, SafetyKeysList = {}, propI,
  Modul
    lastDirI, lastdistanceI, PotNextIDir, tempi, distanceNextPotPointI,
    nextNeighbourNumber, StartAtThisIPoint},

  If[Length[SafetyKeysList] ≠ 0,
    ... Länge
    Clear[SafetyKeysList];
    lösche
  ];
  StartAtThisIPoint = CheckLastPointI;
  nextNeighbourNumber = CheckLastPointI[NeighbourI] + 1;

  propI = proportionI;
  lastDirI = NextIDir;
  lastdistanceI = distanceI;

  For[kk = 1, kk ≤ Length[ConvexHull], kk++,
    For-Schleife    Länge
    If[ConvexHull[[kk]][CellJ] == CheckLastPointI[CellJ] + 1 ||
      wenn
        ConvexHull[[kk]][CellJ] == CheckLastPointI[CellJ] - 1 &&
        ConvexHull[[kk]][CellI] ≥ CheckLastPointI[CellI],

        AppendTo[SafetyList, ConvexHull[[kk]]];
        hänge an bei
    ];
  ];

  Print["SafetyList I = ", SafetyList];
  gib aus    imaginäre Einheit I
  For[uu = 1, uu ≤ Length[SafetyList], uu++,
    For-Schleife    Länge
    (*Print["Start At This JPoint = ", StartAtThisJPoint];*)
    gib aus
    If[SafetyList[[uu]][CoordI] ≠ Start[CoordI] &&
      wenn
        SafetyList[[uu]][CoordI] ≥ StartAtThisIPoint[CoordI] &&
        SafetyList[[uu]][CoordJ] ≥ StartAtThisIPoint[CoordJ] ||

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    SaftyList[[uu]][CoordJ] ≤ StartAtThisIPoint[CoordJ] ,

    PotNextIDir = {StartAtThisIPoint[CoordI] - SaftyList[[uu]][CoordI],
        StartAtThisIPoint[CoordJ] - SaftyList[[uu]][CoordJ]};
    distanceNextPotPointI = Sqrt[Abs[PotNextIDir[[1]]^2 + PotNextIDir[[2]]^2]];
                                [Qua...][Absolutwert]
];
If[SaftyList[[uu]][CoordI] ≠ Start[CoordI] &&
    [wenn]
    SaftyList[[uu]][CoordI] ≠ StartAtThisIPoint[CoordI] &&
    SaftyList[[uu]][CoordI] ≥ StartAtThisIPoint[CoordI] &&
    SaftyList[[uu]][CoordJ] ≤ StartAtThisIPoint[CoordJ] + propI + 0.3 &&
    SaftyList[[uu]][CoordJ] ≥ StartAtThisIPoint[CoordJ] + propI - 0.3 &&
    distanceNextPotPointI ≤ lastdistanceI + 0.5 &&
    SaftyList[[uu]][CoordI] ≥ StartAtThisIPoint[CoordI] + lastdistanceI / 3
    (** (3/4) *) && MemberQ[CheckPoints, SaftyList[[uu]]] == False,
                                [enthalten?] [falsch]
    Print["SaftyListPoint I = ", SaftyList[[uu]]];
    [gib aus] [imaginäre Einheit I]
    AppendTo[CheckPoints, SaftyList[[uu]]];
    [hänge an bei]
    AssociateTo[SaftyKeys,
    [assoziiere mit]
        {SaftyList[[uu]], NeighbourJ → 1, NeighbourI → nextNeighbourNumber}];
    AppendTo[SaftyKeysList, SaftyKeys];
    [hänge an bei]

    lastDirI = {StartAtThisIPoint[CoordI] - SaftyList[[uu]][CoordI],
        StartAtThisIPoint[CoordJ] - SaftyList[[uu]][CoordJ]};
    lastdistanceI = Sqrt[Abs[lastDirI[[1]]^2 + lastDirI[[2]]^2]];
                                [Qua...][Absolutwert]

    propI = SaftyList[[uu]][CoordJ] - StartAtThisIPoint[CoordJ];
    StartAtThisIPoint = SaftyList[[uu]];
    nextNeighbourNumber = nextNeighbourNumber + 1;

    AppendTo[SaftyKeysList, CompleteJGrid[StartAtThisIPoint,
    [hänge an bei]
        ConvexHull, lastdistanceI, propI, Start, 2, nextNeighbourNumber - 1]];

    For[ii = 1, ii ≤ Length[ConvexHull], ii++,
    [For-Schleife] [Länge]
        If[ConvexHull[[ii]][CellJ] == StartAtThisIPoint[CellJ] + 1 ||
        [wenn]
            ConvexHull[[ii]][CellJ] == StartAtThisIPoint[CellJ] - 1 ||
            ConvexHull[[ii]][CellJ] == StartAtThisIPoint[CellJ] &&
            ConvexHull[[ii]][CellJ] ≥ StartAtThisIPoint[CellJ],

            AppendTo[SaftyList, ConvexHull[[ii]]];
            [hänge an bei]
        ];
    ];
];
];
];

```



```

Clear[SafetyList];
|lösche
Return[SafetyKeysList];
|gib zurück
];

CompleteJGrid[StartPointI_, ConvexHull_, StartDistanceJ_, proportionJ_,
Start_, NeighbourNumberJ_, aI_] := Module[{PossiblePointsListJ = {},
|Modul

SortedPointsKeys = <||>, SafetyPossiblePointsListJ = {}, propJ, StartPointForJGrid,
distanceJ, NextNeighbourNumbrtJ, distanceNextPotGridPointJ, tempj,
NextPointJDir, PotNextJDir, NextJDir, CheckPointJ, CheckCellForJ},

propJ = proportionJ;
StartPointForJGrid = StartPointI;
distanceJ = StartDistanceJ;
NextNeighbourNumbrtJ = NeighbourNumberJ;

Print["proportionJ Complete Grid = ", proportionJ];
|gib aus |Gitter

For[aa = 1, aa ≤ Length[ConvexHull], aa++,
|For-Schleife |Länge
If[ConvexHull[[aa]][CellI] == StartPointForJGrid[CellI] + 1 ||
|wenn
ConvexHull[[aa]][CellI] == StartPointForJGrid[CellI] - 1 ||
ConvexHull[[aa]][CellI] == StartPointForJGrid[CellI] && ConvexHull[[aa]][
CellJ] ≤ splits && MemberQ[CheckPoints, ConvexHull[[aa]]] == False,
|enthalten? |falsch
AppendTo[PossiblePointsListJ, ConvexHull[[aa]]];
|hänge an bei
];
];

Print["PossiblePointList = ", PossiblePointsListJ];
|gib aus

For[pp = 1, pp ≤ Length[PossiblePointsListJ], pp++,
|For-Schleife |Länge

If[PossiblePointsListJ[[pp]][CoordJ] ≠ StartPointForJGrid[CoordJ] &&
|wenn
PossiblePointsListJ[[pp]][CoordJ] ≥ StartPointForJGrid[CoordJ] &&
PossiblePointsListJ[[pp]][CoordI] ≤ StartPointForJGrid[CoordI] ||
PossiblePointsListJ[[pp]][CoordI] ≥ StartPointForJGrid[CoordI],

PotNextJDir = {PossiblePointsListJ[[pp]][CoordJ] - StartPointForJGrid[CoordJ],
PossiblePointsListJ[[pp]][CoordI] - StartPointForJGrid[CoordI]};
distanceNextPotGridPointJ = Sqrt[Abs[PotNextJDir[[1]]^2 + PotNextJDir[[2]]^2]];
|Qua... |Absolutwert
];
If[PossiblePointsListJ[[pp]][CoordJ] ≠ StartPointForJGrid[CoordJ] &&
|wenn
PossiblePointsListJ[[pp]][CoordJ] ≠ Start[CoordJ] &&

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PossiblePointsListJ[[pp]][CoordJ] ≥ StartPointForJGrid[CoordJ] &&
PossiblePointsListJ[[pp]][CoordI] ≤ StartPointForJGrid[CoordI] + propJ + 0.3 &&
PossiblePointsListJ[[pp]][CoordI] ≥
  StartPointForJGrid[CoordI] + propJ - (*1.0*)3.0 &&
PossiblePointsListJ[[pp]][CoordJ] ≥ StartPointForJGrid[CoordJ] + distanceJ / 3 &&
distanceNextPotGridPointJ ≤ (distanceJ + 0.9) &&
MemberQ[CheckPoints, PossiblePointsListJ[[pp]]] == False,
  [enthalten? falsch]
Print["PossiblePointsListJ[[pp]] = ", PossiblePointsListJ[[pp]]];
  [gib aus]
NextJDir = { PossiblePointsListJ[[pp]][CoordJ] - StartPointForJGrid[CoordJ],
  PossiblePointsListJ[[pp]][CoordI] - StartPointForJGrid[CoordI] };
distanceJ = Sqrt[Abs[NextJDir[[1]]^2 + NextJDir[[2]]^2]];
  [Qua... Absolutwert]

propJ = PossiblePointsListJ[[pp]][CoordI] - StartPointForJGrid[CoordI];

StartPointForJGrid = PossiblePointsListJ[[pp]];

AppendTo[CheckPoints, PossiblePointsListJ[[pp]]];
  [hänge an bei]
AssociateTo[SortedPointsKeys, {PossiblePointsListJ[[pp]],
  [assoziere mit]
  NeighbourJ → NextNeighbourNumbrtJ, NeighbourI → aI}];
AppendTo[SafetyPossiblePointsListJ, SortedPointsKeys];
  [hänge an bei]
AssociateTo[StartPointForJGrid,
  [assoziere mit]
  {NeighbourJ → NextNeighbourNumbrtJ, NeighbourI → aI}];
NextNeighbourNumbrtJ = NextNeighbourNumbrtJ + 1;
];

];

CheckPointJ = StartPointForJGrid;
CheckCellForJ = StartPointForJGrid[CellJ];

AppendTo[SafetyPossiblePointsListJ, SafetyListJ[Start, StartPointForJGrid,
  [hänge an bei]
  propJ, StartPointForJGrid[CellJ], ConvexHull, distanceJ, NextJDir]];

Clear[PossiblePointsListJ];
  [lösche]
Print["Checklist = ", CheckPoints];
  [gib aus]
Print["NEXT"];
  [gib aus]
Return[SafetyPossiblePointsListJ];
  [gib zurück]
];

CreateSyntheticPointsForFurtherChecks[] := Module[{},
  [Modul]

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];