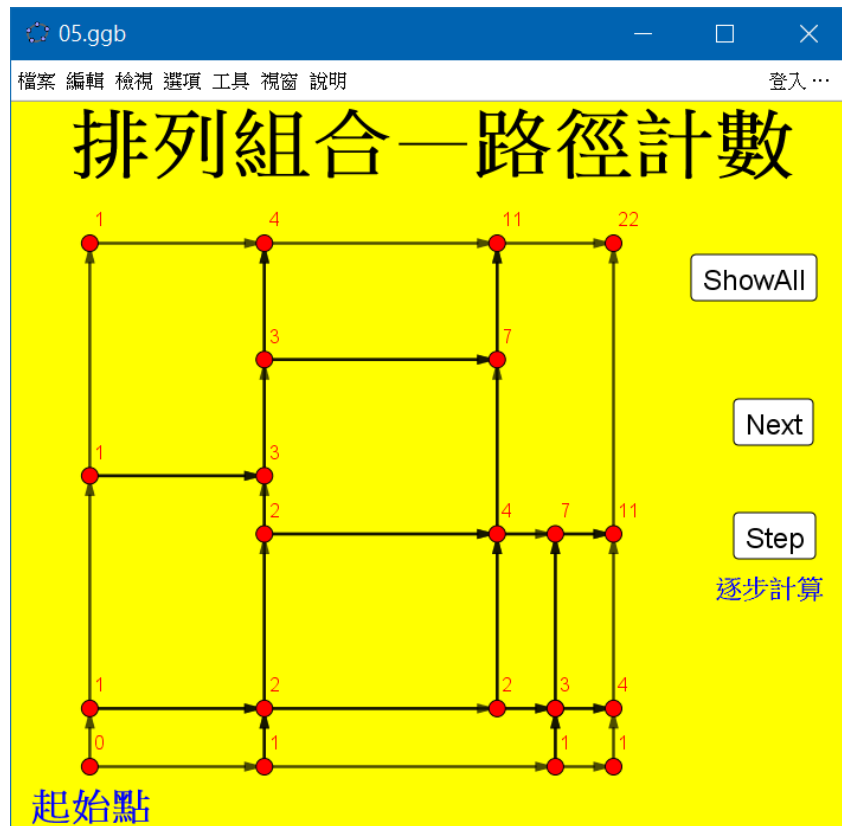


排列組合—路徑計數



做一個向量巨集 `vec4`，後面要用

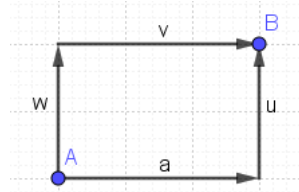
自由產生 A、B 點

`u=vector((x(B),y(A)),B)`

`v=vector((x(A),y(A)),B)`

`w=vector(A,(x(A),y(B)))`

`a=vector(A,(x(B),y(A)))`



【工具】→【新增自製工具】，輸出 `u`、`v`、`w`、`a`，輸入 A、B，命名 `vec4`

-----練習檔 01

`A0=(0,0)`

`A1=(RandomBetween(1,3),RandomBetween(1,3))`

`A2=(RandomBetween(x(A1)+1,8),y(A1))`

`A3=(x(A1),RandomBetween(y(A1)+1,8))`

`A4=(RandomBetween(x(A1)+1,7),RandomBetween(y(A1)+1,7))`

`A5=(RandomBetween(x(A4)+1,8),y(A4))`

`A6=(x(A4),RandomBetween(y(A4)+1,8))`

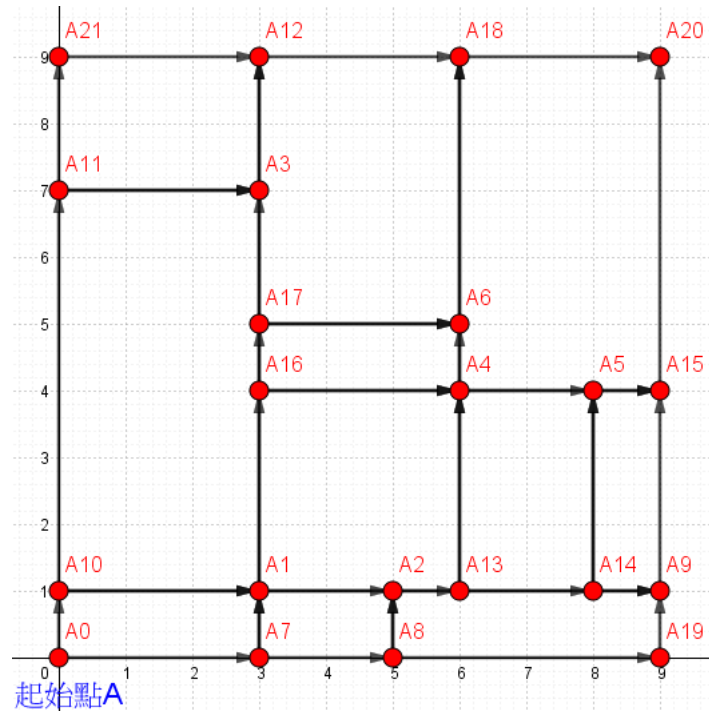
`A7=(x(A1),0)`

`A8=(x(A2),0)`

$A9=(9,y(A2))$
 $A10=(0,y(A1))$
 $A11=(0,y(A3))$
 $A12=(x(A3),9)$
 $A13=(x(A4),y(A1))$
 $A14=(x(A5),y(A1))$
 $A15=(9,y(A5))$
 $A16=(x(A1),y(A4))$
 $A17=(x(A3),y(A6))$
 $A18=(x(A6),9)$
 $A19=(9,0)$
 $A20=(9,9)$
 $A21=(0,9)$

//呼叫巨集

`vec4(A0,A1)`
`vec4(A7,A2)`
`vec4(A8,A9)`
`vec4(A10,A3)`
`vec4(A11,A12)`
`vec4(A1,A4)`
`vec4(A13,A5)`
`vec4(A17,A18)`
`vec4(A14,A6)`
`vec4(A15,A16)`
`vec4(A4,A20)`



懶人包：

```

Execute({"A0=(0,0)","A1=CopyFreeObject((RandomBetween(1,3),RandomBetween(1,3)))","A2=CopyFreeObject((RandomBetween(x(A1)+1,8),y(A1)))","A3=CopyFreeObject((x(A1),RandomBetween(y(A1)+1,8)))","A4=CopyFreeObject((RandomBetween(x(A1)+1,7),RandomBetween(y(A1)+1,7)))","A5=CopyFreeObject((RandomBetween(x(A4)+1,8),y(A4)))","A6=CopyFreeObject((x(A4),RandomBetween(y(A4)+1,8)))","A7=(x(A1),0)","A8=(x(A2),0)","A9=(9,y(A2))","A10=(0,y(A1))","A11=(0,y(A3))","A12=(x(A3),9)","A13=(x(A4),y(A1))","A14=(x(A1),y(A4))","A15=(x(A3),y(A6))","A16=(x(A6),9)","A17=(x(A5),y(A1))","A18=(9,y(A5))","A19=(0,9)","A20=(9,9)","A21=(9,0)","vec4(A0,A1)","vec4(A7,A2)","vec4(A8,A9)","vec4(A10,A3)","vec4(A11,A12)","vec4(A1,A4)","vec4(A17,A18)","vec4(A13,A5)","vec4(A14,A6)","vec4(A15,A16)

```

```
", "vec4(A4,A20)")}
```

-----練習檔 02

```
n0=0
```

```
n1=2
```

```
n2=3
```

```
n3=3
```

```
n7=1
```

```
n8=1
```

```
n9=4
```

```
n10=1
```

```
n11=1
```

```
n19=1
```

```
n12=4
```

```
n21=1
```

```
n13=If(x(A13)>=x(A2),3,2)
```

```
n17=If(x(A17)>=x(A2),3,2)
```

```
n14=If(y(A14)>=y(A3),3,2)
```

```
n15=If(y(A15)>=y(A3),3,2)
```

```
n4=n13+n14
```

```
n5=n4+n17
```

```
n6=n4+n15
```

```
n16=n6+n12
```

```
n18=n5+n9
```

```
n20=n16+n18
```

```
cont=0
```

懶人包：

```
Execute({"n0=0","n1=2","n2=3","n3=3","n7=1","n8=1","n9=4","n10=1","n11=1","n19=1","n12=4","n21=1","n13=If(x(A13)<x(A2),2,3)","n17=If(x(A17)<x(A2),2,3)","n14=If(y(A14)<y(A3),2,3)","n15=If(y(A15)<y(A3),2,3)","n4=n13+n14","n5=n4+n17","n6=n4+n15","n16=n6+n12","n18=n5+n9","n20=n16+n18","cont=0"})
```

將所有點 size 放大到 7

```
Execute[Sequence["SetPointSize(A"+i+",7)",i,0,21]]
```

顏色調成紅色

```
Execute[Sequence["SetColor(A"+i+",1,0,0)",i,0,21]]
```

增加文字

起始點 A

-----練習檔 03

暫時將所有點隱藏

```
Execute[Sequence["setVisibleInView(A"+i+",1,false)",i,0,21]]
```

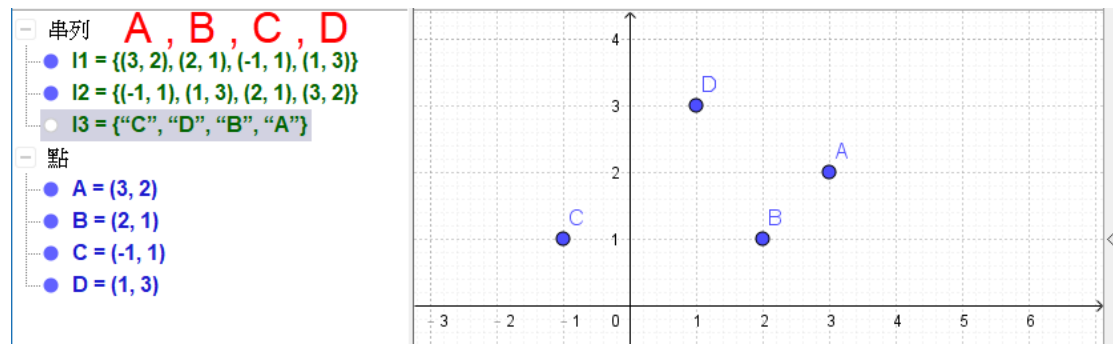
將 A0~A21 標籤換成數字 0~21

```
Execute[Sequence["SetCaption(A"+i+",Text(n"+i+"))",i,0,21]]
```

建立所有點之串列

```
l1=Sort({A0,A1,A2,A3,A4,A5,A6,A7,A8,A9,A10,A11,A12,A13,A14,A15,A16,A17,A18,A19,A20,A21})
```

指令 sort 對串列中點座標的排序：以 x 座標為參照



串列內點座標排序，產生新集合 l2，並取以 l1 中元素之名稱為元素。

```
l2=Sequence[Name(Element(l1,i)),i,1,22] (做完隱藏)
```

做 button 【Step】，按下表示前進下一個點

```
cont=cont+If(cont<22,1,0)
```

```
Execute[{"setVisibleInView("+Element(l2,cont)+",1,true)"}]
```

增加文字

前進下一個點

弄清楚(RandomBetween(1,3),RandomBetween(1,3))與

CopyFreeObject((RandomBetween(1,3),RandomBetween(1,3)))的差異？

做按鍵 【Next】

一開始先刪掉 A1~A18，留下四周的 4 個點

然後重新做一遍完整步驟：

```
A1=CopyFreeObject((RandomBetween(1,3),RandomBetween(1,3)))
A2=CopyFreeObject((RandomBetween(x(A1)+1,8),y(A1)))
A3=CopyFreeObject((x(A1),RandomBetween(y(A1)+1,8)))
A4=CopyFreeObject((RandomBetween(x(A1)+1,7),RandomBetween(y(A1)+1,7)))
A5=CopyFreeObject((RandomBetween(x(A4)+1,8),y(A4)))
A6=CopyFreeObject((x(A4),RandomBetween(y(A4)+1,8)))
A7 以後照舊
```

n0~n21 照舊再寫一次(其實有一些可以不用再重寫一次)

其中將所有點 size 放大到 7 的程式碼：

```
Execute[Sequence["SetPointSize(A"+i+",7)",i,0,21]]
顏色調成紅色
Execute[Sequence["SetColor(A"+i+",1,0,0)",i,0,21]]
```

確認串列 l1、l2 在繪圖區不可見，因為重新建立，會出現在繪圖區，程式碼隱藏方法如下：

```
SetVisibleInView(l1,1,false)
SetVisibleInView(l2,1,false)
```

```
Execute[Sequence["ShowLabel(A"+i+",true)",i,0,21]]
Execute[Sequence["SetLabelMode(A"+i+",3)",i,0,21]]
最後記得計數歸零 cont=0
```

【Next】 完整程式碼：

```
Execute[Sequence["Delete(A"+i+"")",i,1,18]]
A1=CopyFreeObject((RandomBetween(1,3),RandomBetween(1,3)))
vec4(A0,A1)
A2=CopyFreeObject((RandomBetween(x(A1)+1,8),y(A1)))
A7=(x(A1),0)
vec4(A7,A2)
A8=(x(A2),0)
A9=(9,y(A2))
vec4(A8,A9)
A3=CopyFreeObject((x(A1),RandomBetween(y(A1)+1,8)))
A10=(0,y(A1))
vec4(A10,A3)
A11=(0,y(A3))
```

```

A12=(x(A3),9)
vec4(A11,A12)
A4=CopyFreeObject((RandomBetween(x(A1)+1,7),RandomBetween(y(A1)+1,7)))
vec4(A1,A4)
A5=CopyFreeObject((RandomBetween(x(A4)+1,8),y(A4)))
A13=(x(A4),y(A1))
vec4(A13,A5)
A6=CopyFreeObject((x(A4),RandomBetween(y(A4)+1,8)))
A14=(x(A1),y(A4))
vec4(A14,A6)
A15=(x(A3),y(A6))
A16=(x(A6),9)
vec4(A15,A16)
A17=(x(A5),y(A1))
A18=(9,y(A5))
vec4(A17,A18)
vec4(A4,A20)

Execute[Sequence["SetPointSize(A"+i+",7)",i,0,21]]
Execute[Sequence["SetColor(A"+i+",0,0,1)",i,0,21]]
Execute[Sequence["SetVisibleInView(A"+i+",1,false)",i,0,21]]
n13=If(x(A13)<x(A2),2,3)
n17=If(x(A17)<x(A2),2,3)
n14=If(y(A14)<y(A3),2,3)
n15=If(y(A15)<y(A3),2,3)
n4=n13+n14
n5=n4+n17
n6=n4+n15
n12=n3+n19
n16=n6+n12
n18=n5+n9
n20=n16+n18
Execute[Sequence["SetCaption(A"+i+",Text(n"+i+"))",i,0,21]]
l1=Sort({A0, A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14, A15, A16, A17, A18, A19, A20, A21})
l2=Sequence[Name(Element(l1,i)),i,1,22]
SetVisibleInView(l2,1,false)
Execute[Sequence["ShowLabel(A"+i+",true)",i,0,21]]
Execute[Sequence["SetLabelMode(A"+i+",3)",i,0,21]]
cont=0

```