

Blackbook



1299,-

Buy



Adapler

Adapler

Adapler

Blackbook



1299,-

Buy



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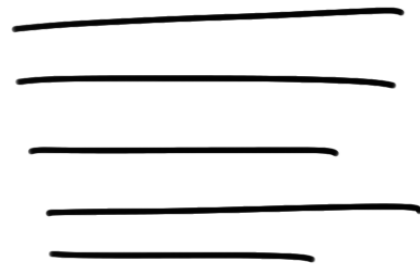
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Adapter Adapter Adapter

```
{  
  product(id: $id) {  
    title  
  }  
}
```

Blackbook

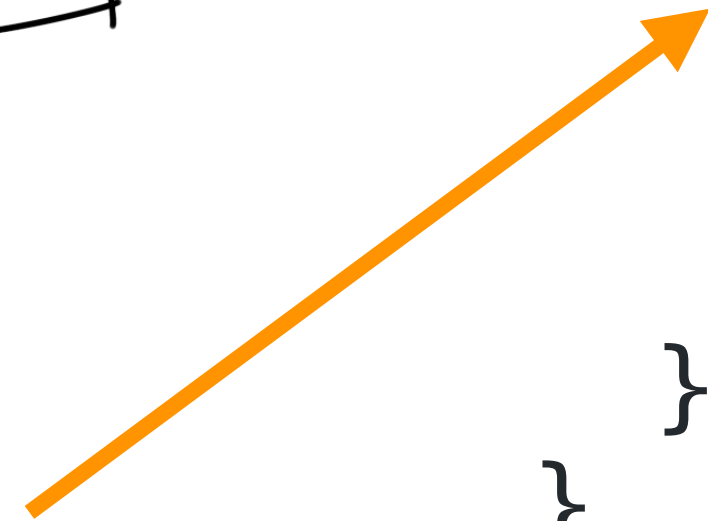


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Adapter Adapter Adapter



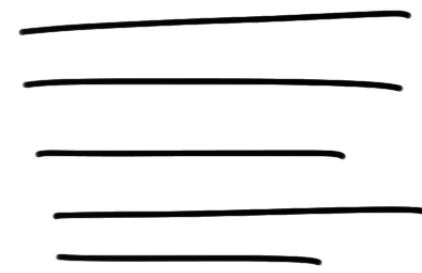
```
{  
  product(id: $id) {  
    title  
    recommendedProducts {  
      title  
      image {  
        url  
      }  
    }  
  }  
}
```

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Adapler Adapler Adapler

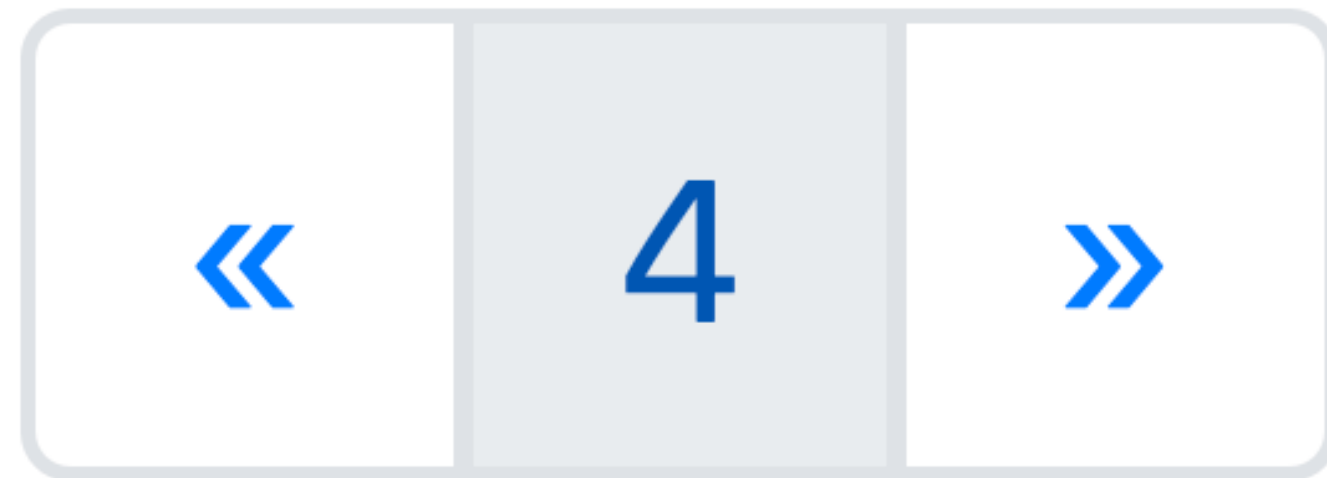
```
{  
  product(id: $id) {  
    title  
    recommendedProducts {  
      title  
      image {  
        url  
      }  
    }  
  }  
}
```

→

```
{  
  product: {  
    title: "Blackbook";  
    recommendedProducts: [  
      {  
        title: "USB to HDMI Adap  
        image: {  
          url: "https://www.note  
        }  
      },  
      {  
        title: "USB to SD Card A  
        image: {  
          url: "https://www.note  
        }  
      },  
    ]  
  }  
}
```

What if the list grows?

What if the list grows?



Pagination ftw 🙌🙌

```
{
  product(id: $id) {
    title
    recommendedProducts {
      title
      image {
        url
      }
    }
  }
}
```



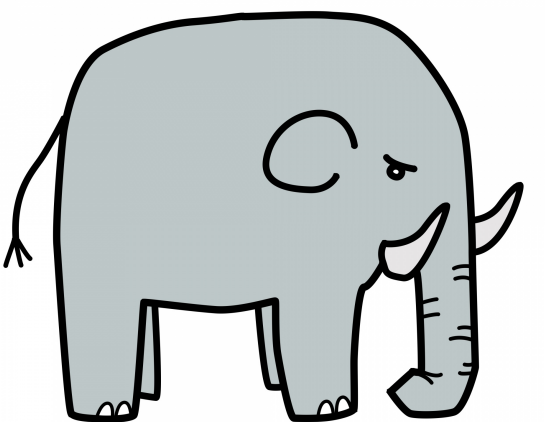
```
{
  product(id: $id) {
    title
    recommendedProducts(limit: 5, page: 2) {
      title
      image {
        url
      }
    }
  }
}
```



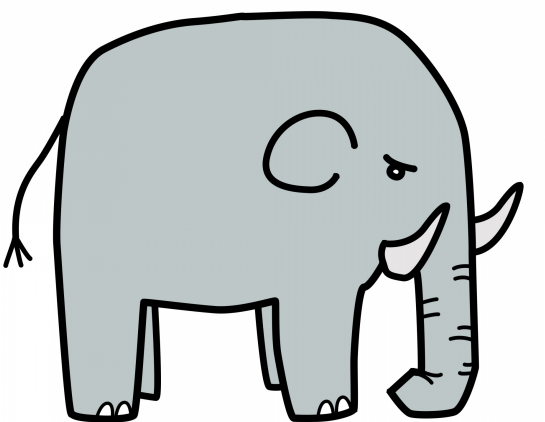

Questions over questions

- Is there a next page?
- Is there a previous page?
- Where do I attach relationship meta data?
- Will I see the same results when I refresh?

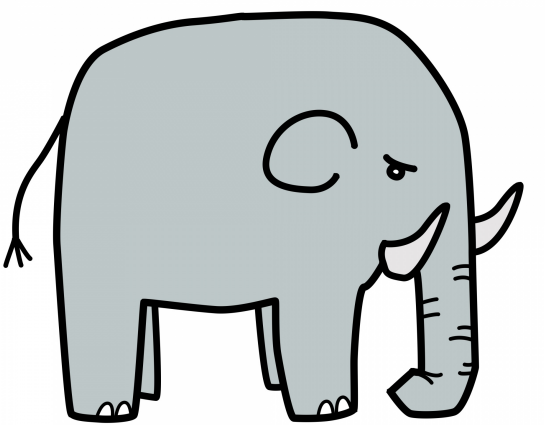
Relay Cursor Connections Specification



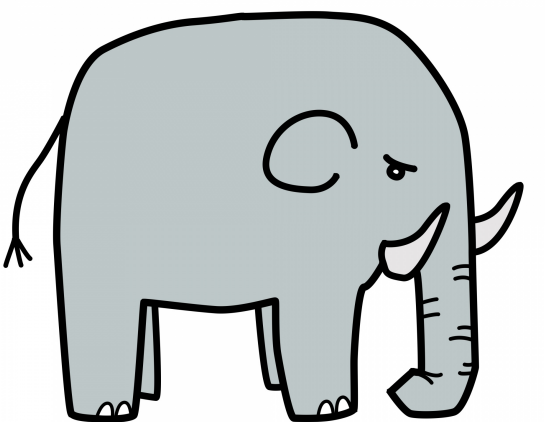
Cursor Connections Specification

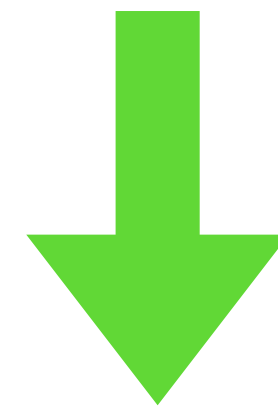


Connections Specification

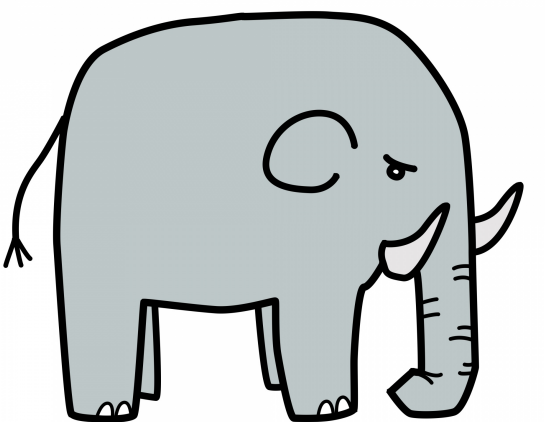


```
{
  product(id: $id) {
    recommendedProducts(first: 5, after: "4e025") {
      edges {
        node {
          title
          image {
            url
          }
        }
      }
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
      startCursor
      endCursor
    }
  }
}
```

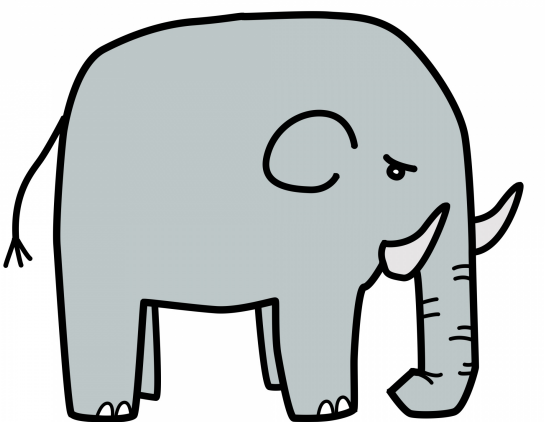




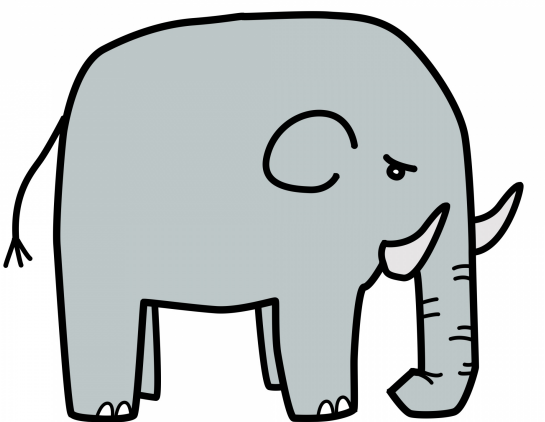
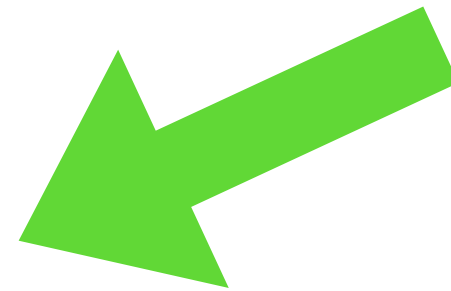
```
{
  product(id: $id) {
    recommendedProducts(first: 5, after: "4e025") {
      edges {
        node {
          title
          image {
            url
          }
        }
      }
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
      startCursor
      endCursor
    }
  }
}
```



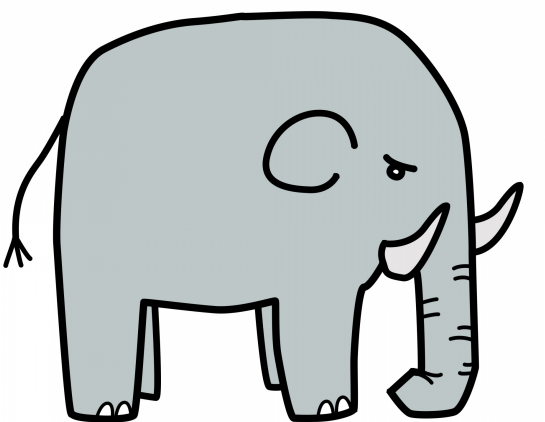

```
{
  product(id: $id) {
    recommendedProducts(first: 5, after: "4e025") {
      edges {
        node {
          title
          image {
            url
          }
        }
      }
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
      startCursor
      endCursor
    }
  }
}
```

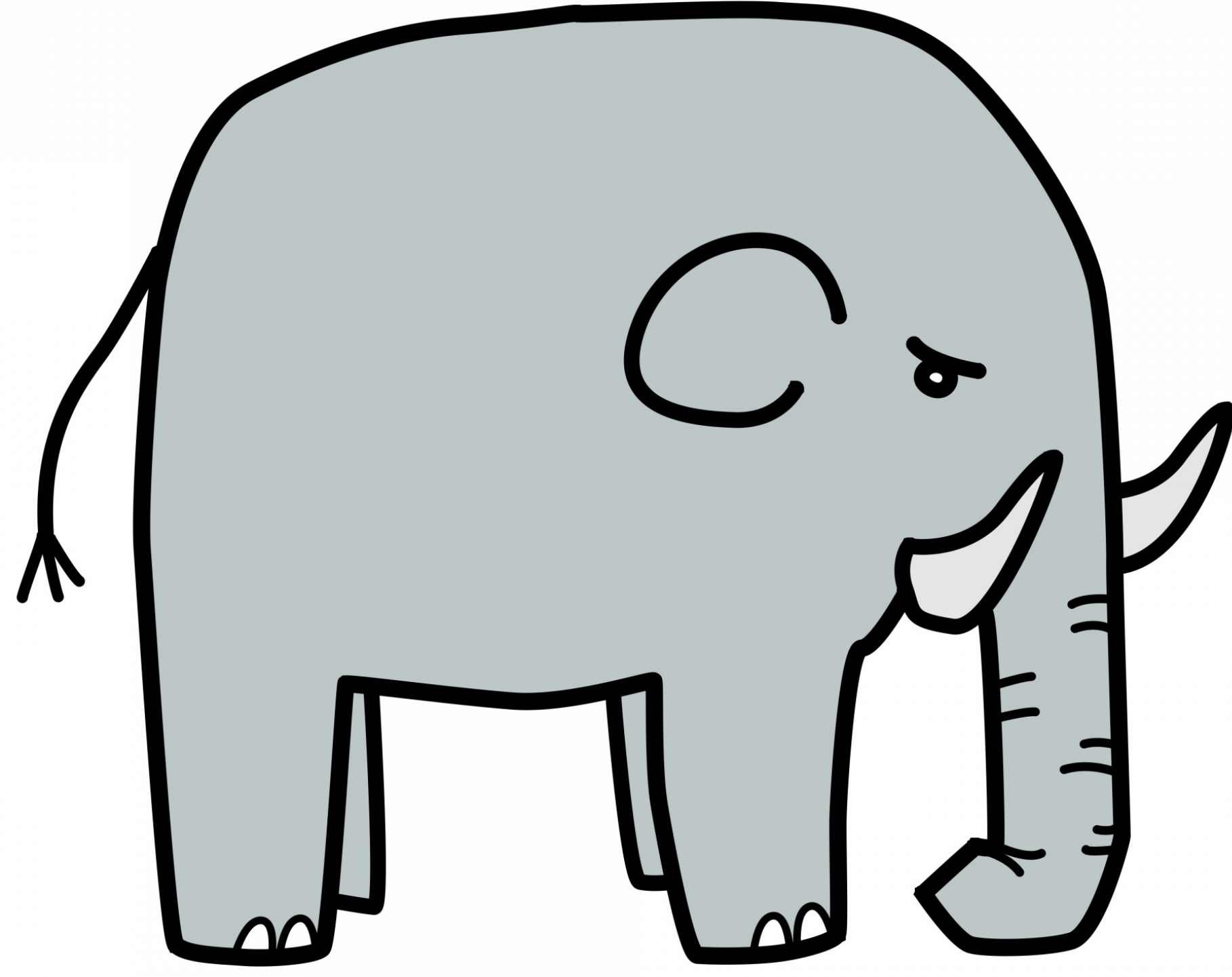


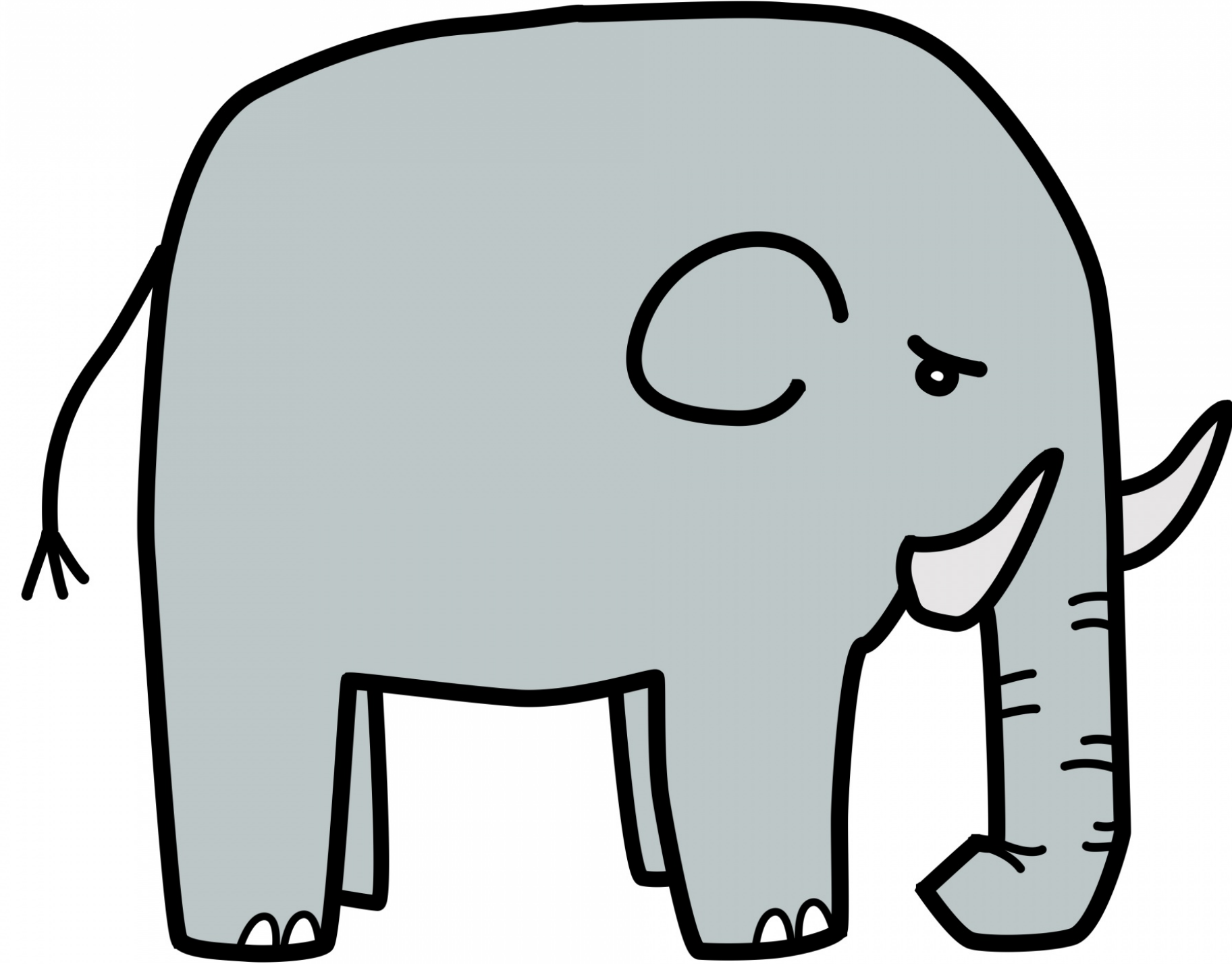
```
{
  product(id: $id) {
    recommendedProducts(first: 5, after: "4e025") {
      edges {
        node {
          title
          image {
            url
          }
        }
      }
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
      startCursor
      endCursor
    }
  }
}
```



```
{
  product(id: $id) {
    recommendedProducts(first: 5, after: "4e025") {
      edges {
        node {
          title
          image {
            url
          }
        }
      }
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
      startCursor
      endCursor
    }
  }
}
```







This is ugly! 🤔

```
{
  product(id: "abc")) {
    title
    recommendedProducts(limit: 5, page: 2) {
      title
      image {
        url
      }
    }
  }
}
```

```
{
  product(id: "abc")) {
    title
    recommendedProducts(limit: 5, page: 2) {
      title
      image {
        url
      }
    }
    recommendedProductsPageInfo(limit: 5, page: 2) {
      hasNextPage
      hasPreviousPage
    }
  }
}
```

```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, page: 2) {
      products {
        name
        image {
          url
        }
      }
      pageInfo {
        hasNextPage
        hasPreviousPage
      }
    }
  }
}
```


Blackbook



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Buy



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Adapler

Adapler

Blackbook



1299,-

Buy



Adapler

99%
bought

Adapler

85%
bought

Adapler

70%
bought

```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, page: 2) {
      products {
        name
        image {
          url
        }
      }
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
    }
  }
}
```

```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, page: 2) {
      products {
        name
        image {
          url
        }
        boughtTogetherPercentage
      }
      pageInfo {
        hasNextPage
        hasPreviousPage
      }
    }
  }
}
```

```
type Product {  
  title: String!  
  image: Image!  
}
```

```
type Product {  
  title: String!  
  image: Image!  
  boughtTogetherPercentage: Float  
}
```

```
type Product {  
  title: String!  
  image: Image!  
  boughtTogetherPercentage: Float  
}
```

```
{  
  product(id: $id) {  
    title  
    boughtTogetherPercentage # WHAT?  
  }  
}
```

```
type Product {  
  title: String!  
  image: Image!  
}
```

```
type RelatedProduct {  
  title: String!  
  image: Image!  
  boughtTogetherPercentage: Float!  
}
```



```
type Product {  
  title: String!  
  image: Image!  
}
```

```
type RelatedProduct {  
  boughtTogetherPercentage: Float!  
  product: Product!  
}
```

```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, page: 2) {
      products {
        name
        image {
          url
        }
        boughtTogetherPercentage
      }
      pageInfo {
        hasNextPage
        hasPreviousPage
      }
    }
  }
}
```

```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, page: 2) {
      recommendedProducts {
        product {
          name
          image {
            url
          }
        }
      }
      boughtTogetherPercentage
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
    }
  }
}
```

```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, page: 2) {
      recommendedProducts {
        product {
          name
          image {
            url
          }
        }
      }
      boughtTogetherPercentage
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
    }
  }
}
```



Server

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Client

Server

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Limit 5, page 0

Client

1
2
3
4
5

Server

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Limit 5, page 0

Limit 5, page 1

Client

1
2
3
4
5
6
7
8
9
10

Server

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Client

Server

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Limit 5, page 0

Client

1
2
3
4
5

Server

1
2

5
6
7
8
9
10
11
12
13
14
15

Limit 5, page 0

Client

1
2
3
4
5

Server

1
2

5
6
7
8
9
10
11
12
13
14
15

Limit 5, page 0

Client

1
2
3
4
5

Server

1
3

5
6
7
8
9
10
11
12
13
14
15

Limit 5, page 0

Limit 5, page 1

Client

1
2
3
4
5
8
9
10
11
12

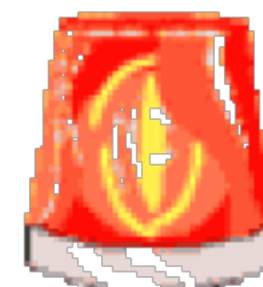
Server

1
3

5
6
7
8
9
10
11
12
13
14
15

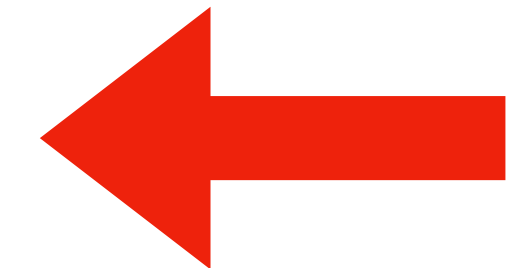
Limit 5, page 0

Limit 5, page 1



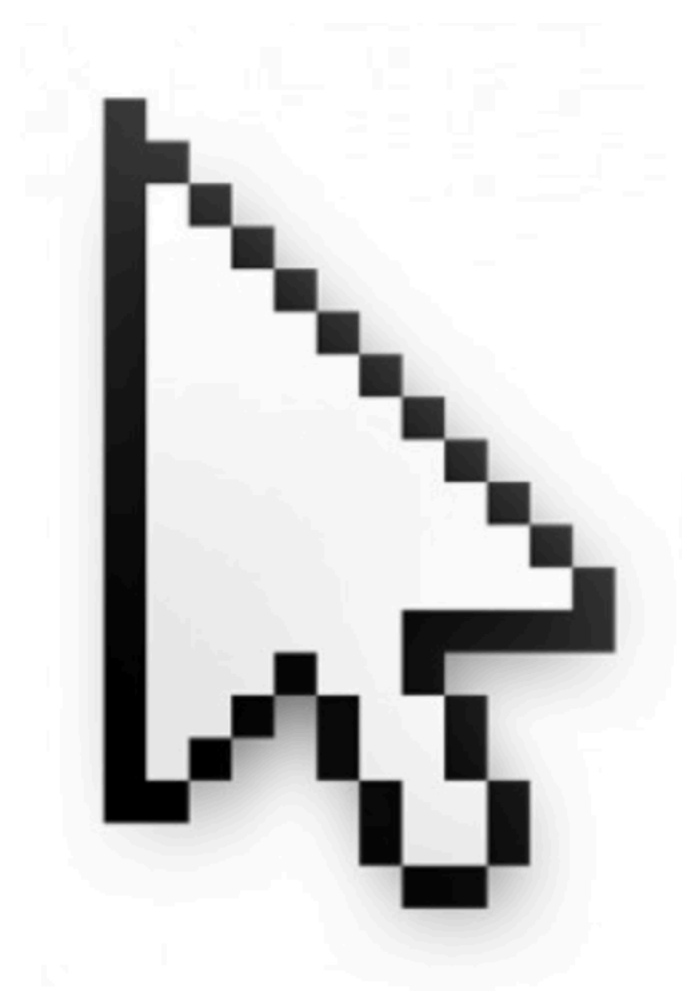
Client

1
2
3
4
5
8
9
10
11
12




Where are 6 & 7?

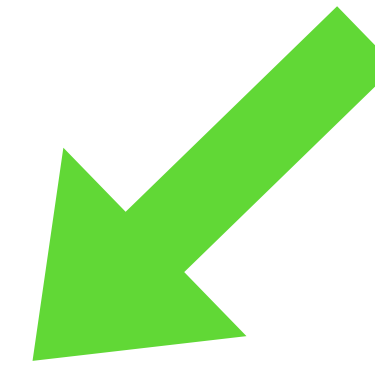




```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, page: 2) {
      recommendedProducts {
        product {
          name
          image {
            url
          }
        }
      }
      boughtTogetherPercentage
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
    }
  }
}
```




```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, after: "4e025") {
      recommendedProducts {
        product {
          name
          image {
            url
          }
        }
      }
      boughtTogetherPercentage
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
    }
  }
}
```



Server

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Client

Server

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

Limit 5, after undefined

Client

1
2
3
4
5

Server

1
2

5
6
7
8
9
10
11
12
13
14
15

Limit 5, after undefined

Client

1
2
3
4
5

Server

1
2

5
6
7
8
9
10
11
12
13
14
15

Limit 5, after undefined

Limit 5, after 5

Client

1
2
3
4
5
6
7
8
9
10

```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, after: "4e025") {
      recommendedProducts {
        product {
          name
          image {
            url
          }
        }
      }
      boughtTogetherPercentage
    }
    pageInfo {
      hasNextPage
      hasPreviousPage
    }
  }
}
```

```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, after: "4e025") {
      recommendedProducts {
        product {
          name
          image {
            url
          }
        }
        boughtTogetherPercentage
      }
      pageInfo {
        hasNextPage
        hasPreviousPage
        startCursor
        endCursor
      }
    }
  }
}
```

Cursors aren't perfect!

Messages

Caroline

Edit

For the past couple of weeks I've been seeing your sister

at Trader Joe's buying lots of those single-serving salads. We should have her over for dinner.



Not Delivered

What?!? When?!?

Any evening I'm not working. Nothing fancy, just something hot and easy.



Cursors

```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, after: "4e025") {
      recommendedProducts {
        product {
          name
          image {
            url
          }
        }
        boughtTogetherPercentage
      }
      pageInfo {
        hasNextPage
        hasPreviousPage
        startCursor
        endCursor
      }
    }
  }
}
```

```
{
  product(id: "abc") {
    name
    recommendedProducts(limit: 5, after: "4e025") {
      edges {
        node {
          name
          image {
            url
          }
        }
        boughtTogetherPercentage
      }
      pageInfo {
        hasNextPage
        hasPreviousPage
        startCursor
        endCursor
      }
    }
  }
}
```