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## Sets in GAMS

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Sets

- Sets are equivalent to subscripts in algebra
- Are used to make the same operation for many objects

```
$Title OLS-Example
$Ontext
This code calculates an
OLS-Regression.
$Offtext
Set i observations /1*5/
Parameters
x(i) explanatory variable
/
1      1
2      5
3      9
4     13
5     17 /
*note absense of a semicolon
*on a previous line
y(i) dependent variable
/
1      -27
2      -24
3      -21
4      -18
5      -15 /;
Variables
Intercept      Intercept
```

Syntax

- Define set: **Keyword name** *comment /element1, element2, element3.../* ;
- Subset of i: **Set** *h(i) only first 2 elements* /a1, a2/;
- Can indicate it with the **Keyword**, list all sets and subsets, then end listing with ;
  
- **Parameters, Variables: name(domain)**
  
- **Example:**

```
Set i observations /a1,a2,a3,a4,a5/;

Parameters
x(i) explanatory variable
/
a1      1
a2      5
a3      9
a4     13
a5     17    /;
```

Data of M221\_A in set-notation

- Data (MCM)
- Declare sets and subsets
- Alias-Statement
- Assign data: use "table"

Markets	Agents		
	FirmX	FirmY	Consumer
GoodX	100		-100
GoodY		100	-100
FactorL	-60	-40	100
FactorK	-40	-60	100

Sets

```

a agents / FirmX, FirmY, Consumer /
f(a) firms / FirmX, FirmY /
h(a) households / Consumer /
i markets /GoodX, GoodY, FactorL, FactorK/
gm(i) goods markets /GoodX, GoodY/
fm(i) factor markets /FactorL, FactorK/;

```

Alias (fm, j);

```

Table Data(i,a) Payments
      FirmX FirmY Consumer
GoodX      100      -100
GoodY      100      -100
FactorL     -60     -40     100
FactorK     -40     -60     100 ;

```

A side note

- **Sums:**         $sum(j, x(i,j))$         *sum over j*  
                   $sum((i,j),x(i,j))$         *sum over i and j*
- **Products:**     $prod(j, x(i,j))$         ...
- *To remember some further notation rules:*

<i>To make comments</i>	<b>*; \$ontext \$offtext</b>
<i>Case sensitive?</i>	<b>no</b>
<i>To list elements of a set</i>	<b>/ /</b>
<i>Elements follow sequence</i>	<b>1991*2000</b>
<i>Sum over i (rows)</i>	<b>sum(i, x(i,j))</b>
<i>To the power</i>	<b>**</b>
<i>Equal to</i>	<b>=e=</b>
<i>Greater or equal to</i>	<b>=g=</b>
<i>Less or equal to</i>	<b>=l=</b>