

Handbook of SAS® Data Step Programming

Execution Phase of Program 3.3

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The Execution Phase of Program 3.3

```
data ex3_2;  
  set sas3_1;  
  retain total 0;  
  total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K

- ❖ The execution phase begins immediately after the completion of the compilation phase

The Execution Phase of Program 3.3

```
➔ data ex3_2;  
    set sas3_1;  
    retain total 0;  
    total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
1		0							



1st Iteration:

❖ $_N_ \leftarrow 1, _ERROR_ \leftarrow 0$

The Execution Phase of Program 3.3

```
➔ data ex3_2;  
    set sas3_1;  
    retain total 0;  
    total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
1		0				.			



1st Iteration:

- ❖ $_N_ \leftarrow 1$, $_ERROR_ \leftarrow 0$
- ❖ $ID, SCORE \leftarrow \text{missing}$

The Execution Phase of Program 3.3

```
➔ data ex3_2;  
    set sas3_1;  
    retain total 0;  
    total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
1		0				.		0	




1st Iteration:

- ❖ $_N_ \leftarrow 1$, $_ERROR_ \leftarrow 0$
- ❖ $ID, SCORE \leftarrow \text{missing}$
- ❖ $TOTAL \leftarrow 0$ because of the RETAIN statement

The Execution Phase of Program 3.3

```
data ex3_2;  
  ➔ set sas3_1;  
  retain total 0;  
  total = sum(total, score);  
run;
```

SAS3_1:



	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
1		0		A01		3		0	



1st Iteration:

❖ 1st observation from SAS3_1 → PDV

The Execution Phase of Program 3.3

```
data ex3_2;  
  set sas3_1;  
  ➡ retain total 0;  
  total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
1		0		A01		3		0	

1st Iteration:

- ❖ The RETAIN statement is declarative statement; it does not execute during the execution phase

The Execution Phase of Program 3.3

```
data ex3_2;  
  set sas3_1;  
  retain total 0;  
  ➡ total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
1		0		A01		3		3	



1st Iteration:

❖ TOTAL is calculated

The Execution Phase of Program 3.3


```
data ex3_2;  
  set sas3_1;  
  retain total 0;  
  total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
1		0		A01		3		3	



1st Iteration:

- ❖ The implicit OUTPUT statement tells the SAS system to write observations to the dataset

EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3

The Execution Phase of Program 3.3

```
➔ data ex3_2;  
    set sas3_1;  
    retain total 0;  
    total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
2		0		A01		3		3	



2nd Iteration:

❖ _N_ ↑2

EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3

The Execution Phase of Program 3.3

```
➔ data ex3_2;  
    set sas3_1;  
    retain total 0;  
    total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
2		0		A01		3		3	



2nd Iteration:

- ❖ _N_ ↑2
- ❖ ID and SCORE are retained from the previous iteration they are read from an existing SAS dataset

EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3

The Execution Phase of Program 3.3

```
➔ data ex3_2;  
    set sas3_1;  
    retain total 0;  
    total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
2		0		A01		3		3	



2nd Iteration:

- ❖ $_N_ \uparrow 2$
- ❖ ID and SCORE are retained from the previous iteration they are read from an existing SAS dataset
- ❖ TOTAL is also retained because the RETAIN statement is used


EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3

The Execution Phase of Program 3.3

```
data ex3_2;  
  ➔ set sas3_1;  
  retain total 0;  
  total = sum(total, score);  
run;
```

SAS3_1:



	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
2		0		A02		.		3	



2nd Iteration:

❖ 2nd observation from SAS3_1 →
PDV

EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3

The Execution Phase of Program 3.3

```
data ex3_2;  
  set sas3_1;  
  retain total 0;  
  ➔ total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
2		0		A02		.		3	



2nd Iteration:

❖ TOTAL is calculated

EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3

The Execution Phase of Program 3.3


```
data ex3_2;  
  set sas3_1;  
  retain total 0;  
  total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
2		0		A02		.		3	



2nd Iteration:

- ❖ The implicit OUTPUT:
The contents in PDV → EX3_2

EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3
2	A02	.	3

The Execution Phase of Program 3.3

```
➔ data ex3_2;  
    set sas3_1;  
    retain total 0;  
    total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
3		0		A02		.		3	

3rd Iteration:

- ❖ _N_ ↑ 3
- ❖ ID and SCORE are retained from the previous iteration
- ❖ TOTAL is also retained

EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3
2	A02	.	3

The Execution Phase of Program 3.3

```
data ex3_2;  
  ➔ set sas3_1;  
  retain total 0;  
  total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4



PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
3		0		A03		4		3	



3rd Iteration:

❖ 3rd observation from SAS3_1 →
PDV

EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3
2	A02	.	3

The Execution Phase of Program 3.3

```
data ex3_2;  
  set sas3_1;  
  retain total 0;  
  ➡ total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
3		0		A03		4		7	



3rd Iteration:

❖ TOTAL is calculated

EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3
2	A02	.	3

The Execution Phase of Program 3.3

```
data ex3_2;  
  set sas3_1;  
  retain total 0;  
  total = sum(total, score);  
run;
```

SAS3_1:

	ID	SCORE
1	A01	3
2	A02	.
3	A03	4

PDV

N	D	_ERROR_	D	ID	K	SCORE	K	TOTAL	K
3		0		A03		4		7	



3rd Iteration:

❖ The implicit OUTPUT:

The contents in PDV → EX3_2

EX3_2:

	ID	SCORE	TOTAL
1	A01	3	3
2	A02	.	3
3	A03	4	7