MUMPS Development Committee

Extension to the MDC Standard
Type A Release of the MUMPS Development Committee

SET $QS[UBSCRIPT] pseudo function

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Produced by the MDC Subcommittee #13
Data Management and Manipulation

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1. Identification of proposed change

1.1 Title

SET $QS[UBSCRIPT] pseudo function to set a selected subscript of a <u>namevalue</u>.

1.2 MDC Proposer and Sponsor

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1.3 Motion

None, final MDC type A document superseding X11/SC13/97-4.

1.4 History

August 1997	X11/97-22	Final document with editorial corrections.
March 1997	X11/SC13/97-4	History updated, submitted for task group discussion and elevation to MDC type A. Passed 16-5-4
September 1996	X11/SC13/96-12	Modified proposal submitted for task group discussion and elevation to SC13 type A. Passed 17-4-5
March 1996	X11/SC13/96-2	Modified proposal submitted for task group discussion and elevation to SC13 type A. Remanded to task group.
October 1995	X11/SC13/95-24	Modified per direction and submitted for elevation to MDC Type A. Failed 4-20-5 demoting proposal to an SC13 type B.
April 1995	X11/SC13/TG13/95-1	Modified proposal submitted for task group discussion and elevation to SC13 type A. Passed 10-3-7
January 1995	X11/SC13/TG13/94-9	Modified proposal submitted for task group discussion and elevation to SC13 type B. Passed 9-8-6
June 1994	X11/SC13/TG13/94-5	Initial proposal submitted for task group discussion

1.5 Dependencies

None

2. Justification of proposed change.

2.1 Needs

The $QSUBSCRIPT function enables a program to extract a subscript from a <u>namevalue</u> in much the same way that $PIECE extracts a substring from a string.

However, there is currently no simple method of setting a subscript in a <u>namevalue</u> as there is in using $PIECE to set a substring in a string.

2.2 Existing practice in Area of Proposed Change

Currently one has to write code sort of like this:

```
; assume X is a namevalue and you want to set the 3rd subscript to NewVal
IF $QLENGTH(X)=0 SET X=$NAME(@X@("","",NewVal))
ELSE   IF $QLENGTH(X)=1 SET X=$NAME(@X@("",NewVal))
ELSE   IF $QLENGTH(X)<4 SET X=$NAME(@$NAME(@X,2)@(NewVal))
ELSE   DO
. NEW I,T
```

```
. SET T=$NAME(@X,2)
. SET T=$NAME(@T@(NewVal)) .
. FOR I=4:1:$QLENGTH(X) SET T=$NAME(@T@($QSUBSCRIPT(X,I)))
. SET X=T
```

This is the equivalent of having to set the 3rd piece of a string by:
```
IF $LENGTH(X,"/")=1 SET X=X_"//"_NewVal
ELSE   IF $LENGTH(X,"/")<4 SET X=$PIECE(X,"/",1,2)_"/"_NewVal
ELSE   SET X=$PIECE(X,"/",1,2)_"/"_NewVal_"/"_$PIECE(X,"/",4,$LENGTH(X,"/"))
```
Instead of just typing:
```
SET $PIECE(X,"/",3)=NewVal
```

3. Description of Proposed Change

3.1 General description of proposed change

A new leftexpr would be added to the SET command allowing one to write
```
SET $QS(X,3)=NewVal
```

3.2 Annotated examples of use
```
SET X=$NAME(^INVOICE)      ; copy ^INVOICE to ^FOO
FOR   SET (X,Y)=$Q(@X) QUIT:X=""   SET $QS(Y,0)=$NA(^FOO,0),@Y=@X

SET X=$NAME(^|"Here,There,Anywhere"|FOO(2,"Smith, )John(",7))
SET $QS(X,-1)=NewEnv       ; change environment
```

3.3 Formalization (references are to Canvass Document for ANSI/MDC X11.1-1994 as modified by X11/95-21 SET command clarification)

In Section 8.2.18 SET, add setqsub to the list of leftexpr's:

leftexpr ::= | setqsub |

Insert the following:

setqsub ::= $QS[UBSCRIPT] (glvn , intexpr)

See 7.1.2 for the definition of glvn. See 7.1.4.6 for the definition of intexpr.

Modify the setargument discussion as follows:

a) One of the following two operations ...

2) If the portion of the setargument to the left of the = consists of a setpiece or a setextract or a setqsub, the glvn that is the first argument of the setpiece or setextract or setqsub is scanned in left-to-right order and all subscripts are evaluated in left-to-right order within the glvn, and then the remaining arguments of the setpiece or setextract or setqsub are evaluated in left-to-right order.

c) One of the following _(appropriate count)_ operations is performed.

Insert before the setting $X and $Y discussion:

n) For each setleft that is a setqsub of the form $QSUBSCRIPT(nv,m), if the value of nv is not a valid namevalue, an error condition occurs with ecode="M90". Otherwise, let t be the value of expr and nv in the form NAME($s_1,s_2,...,s_n$), considering n to be zero if there are no subscripts, is modified according to the value of intexpr m as follows:

1.   Values of m less than -1 are reserved for possible future use by the MDC.

2.   If m=-1, the <u>environment</u> is changed to t

3.   If m=0, the <u>name</u> is changed to t

4.   If m>n, the intervening n+1 through m-1 subscripts are each set to the empty string and
        the mth subscript is set to t

5.   Otherwise, the mth subscript is changed to t

If the resulting value of nv is not a valid <u>namevalue</u>, an error condition occurs with <u>ecode</u>="M90".

Note that the original and resulting <u>namevalues</u> are not "executed", and will not modify the naked
indicator beyond those modifications described at the end of this clause. Note also that the <u>namevalues</u>,
while meeting the syntax of a <u>namevalue</u>, might specify a non-existent <u>environment</u> or contain a
subscript value (such as the empty string or control characters) which do not meet the requirements of
Section II Clause 2.3.3 (Values of subscripts).

Add to the error code Annex:
        M90   invalid <u>namevalue</u>

4. Implementation Effects

4.1 Effect on Existing User Practices and Investments

This will have no effect on existing MUMPS code. It's anticipated that a positive impact on existing
practices will occur.

4.2 Effect on Existing Vendor Practices and Investments

Vendors have attended both task group and SC13 meetings. To date, no vendor has identified any undue
impact by this proposal. It's understood that most implementers store <u>namevalues</u> in a fashion that
permits them to efficiently affect the naked indicator and "walk" through a structure with $QUERY. This
proposal is in effect a form of SET $PIECE of a <u>namevalue</u> using a "*magic*" delimiter to SET the <u>name</u> or
subscript. As such, it's not expected to be an onerous task to implement this proposal.

4.3 Techniques and Costs for Compliance Verification

A basic technique for verifying that SET $QS works properly is to set a variable to a <u>namevalue</u>, perform
one or more SET $QS's on the variable, and compare the result with what you expect. For example:
```
SET (X,Y)=$NAME(^FOO(1,2,3))
FOR I=5:-1:1 SET $QS(X,I)=I+10
IF X'=$NAME(^FOO(11,12,13,14,15)) WRITE "Ugg 1",!
SET $QS(Y,0)=$NAME(^BARF("A"),C)
IF Y'=$NAME(^BARF(1,2,3)) WRITE "Ugg 2",!
```

Additionally compliance testing should ensure that an M90 error occurs if either the original or resulting
string does not meet the form of a <u>namevalue</u>. It should also ensure that no error occurs if the <u>namevalue</u>
"names" a non-existent <u>environment</u> or contains subscript values which do not meet the requirements of
Section II Clause 2.3.3 (Values of subscripts).

4.4 Legal Considerations

None known

5. Closely Related Standards Activities

5.1 Other X11 Proposals Under Consideration

None known.

5.2 Other Related Standards Efforts

None known.

5.3 Recommendations for Coordinating Liaison

None.

6. Associated Documents

None

7. Issues, Pros and Cons, and Discussion

June 1994 MDC meeting

Only task group discussions addressed this proposal. Following is a list of starter pros.

Pro	Con
1. Widely useful	
2. Enhances usefulness of namevalue	

January 1995 MDC meeting

Pro	Con
1. Useful functionality	1. Should be a library function
2. Parallels other MUMPS constructs	2. Minimal value
3. Functionality has been implemented (MIIS)	3. Can be done in other ways
	4. Doesn't allow for deletion of complete subscript
	5. Doesn't allow for replacement of subscript range.
	6. Encourages use of empty subscripts ("")

Re con 1, the task group felt it's important to have strong symmetry with the 3-arg form of $PIECE. Also, the syntax of the SET command currently does not allow a library function to be an argument.

Re con 2, this is a matter of personal opinion, the task group considers the functionality useful and some members mentioned that the need for this had arisen in the past.

Re con 3, this could probably be said for most of the proposals that are brought before the MDC. The question is, is this method more efficient and easier to read and understand than some alternate method.

Re cons 4 and 5, the task group considered a three or more argument form and decided to wait for set positional before addressing changes to ranges of subscripts. Note that nothing in this proposal precludes extending it in the future.

Re con 6, its unclear to the author how this proposal encourages empty subscripts, that's a design issue when designing an applications global structure. Note that most implementations will invoke the error handler if one tries to reference something with an empty string as one of the subscripts.

June 1995 MDC meeting

Pro	**Con**
1. Useful functionality	1. Should be a library function
2. Parallels other MUMPS constructs	2. Minimal value
3. Functionality has been implemented (MIIS)	3. Can be done in other ways
4. Enhances usefulness of namevalue	4. Doesn't allow for deletion of complete subscript
	5. Doesn't allow for replacement of subscript range.

Re con 1, the task group felt it's important to have strong symmetry with the 3-arg form of $PIECE. Also, the syntax of the SET command currently does not allow a library function to be an argument.

Re con 2, this is a matter of personal opinion, the task group considers the functionality useful and others have mentioned that the need for this had arisen in the past.

Re con 3, this could probably be said for most of the proposals that are brought before the MDC. The question is, is this method more efficient and easier to read and understand than some alternate method.

Re cons 4 and 5, the task group considered a three or more argument form and decided to wait for set positional before addressing changes to ranges of subscripts. Note that nothing in this proposal precludes extending it in the future.

October 1995 MDC meeting

Pro	**Con**
1. Useful functionality	1. Section 4.2 doesn't identify vendors queried
2. Parallels other MUMPS constructs	2. Not really needed
3. Functionality has been implemented (MIIS)	3. Should be a library function
4. Symmetrical with $P and $E	4. Minimal value
	5. Can be done in other ways
	6. Doesn't allow for deletion of complete subscript
	7. Doesn't allow for replacement of subscript range.
	8. Encourages use of empty subscripts ("")
	9. Formalization is unclear.

Re con 1, section 4.2 has been modified to note that to date NO vendor has submitted any comments to be included.

Re cons 2 and 4, this is a matter of personal opinion, the task group considers the functionality useful and others have mentioned that the need for this had arisen in the past.

Re con 3, the task group felt it's important to have strong symmetry with the 3-arg form of $PIECE. Also, the syntax of the SET command currently does not allow a library function to be an argument.

Re con 5, this could probably be said for most of the proposals that are brought before the MDC. The question is, is this method more efficient and easier to read and understand than some alternate method.

Re cons 6 and 7, the task group considered a three or more argument form and decided to wait for set positional before addressing changes to ranges of subscripts. Note that nothing in this proposal precludes extending it in the future.

Re con 8, its unclear to the author how this proposal encourages empty subscripts, that's a design issue when designing an applications global structure. Note that most implementations will raise an error if one tries to reference something with an empty string as one of the subscripts.

Re con 9, this is the only technical con and resulted from a somewhat hasty task group wording change. The formalization has been corrected and glossary entries added to clarify the intent.

March 1996 MDC Meeting
No formal vote was taken, there was a lot of discussion concerning the note on the effect on the naked indicator. The proposal was remanded to the task group.

Sept 1996 MDC Meeting
No suggestions for changes were made in taskgroup or subcommittee meetings. It was noted that this would be useful for $Order like library functions under taskgroup discussion.

Pro	**Con**
1. Useful functionality	1. Already done by other means
2. Parallels other MUMPS constructs	2. Of minimal value
3. Functionality already implemented	
4. Intuitive	

Re con 1, refer to the discussion of October 1995 con 5.

Re con 2, refer to the discussion of October 1995 con 2 and 4.

March 1997 MDC Meeting
Final list of pros and cons

Pro	**Con**
1. Useful functionality	1. error code requires parsing namevalue twice
2. useful in conjunction with already approved extensions	2. should be a library function
3. symmetry with SET $EXTRACT and SET $PIECE	3. of limited use
4. useful functionality	

8. Glossary

"executing" a namevalue   a namevalue is "executed" when it is used in an indirect reference (i.e. @Ref) or subscripted indirectness (i.e. @Ref@(3))