%3!<%Q%9$+$i$N3J%U%l!<%`H><+F03MF@$N$?$a$N ;Y1g4D6-$N9=C[

CfDM 9,5#　1'DEO$ Ip?N　>>K\ M5<#
F`NI@hC<2J3X5;=QBg3X1!Bg3X >pJs2J3X8&5f2J
mailto:{yukita-n,utsuro,matsu}@is.aist-nara.ac.jp

1 O8aK

7W;;5!Kh$k<+A38@8l2r@O$r<B8=5;k?aK$O!"BPLu<-=q$d3J%U%l!<%`<-=q$J$I$H$$$C$?!"?M4V$N8@8lCN<1$r7W;;5!$GMxMQ$G$-$k$h$&$KI=8=$7$?8@8l<-=q$N0Hw$d9=C[$,IT2D7g$K$J$k$,!"=>Mh$N8@8l=hM}%7%9%F%`K*$$$F$O!"$3li$N8@8l<-=q$O9Y$F!"?M4V$N<jKhCF9=C[$,9T$olF$-$?!#7+$7!"?M<j$Khk8@8l<-=q$N9=C[$K$O!" **1.** KDBg$J8@8lCN<1NL$KH<$&:n6H%3%9%H, **2.** <-=q$N0l4S@-$NJ];}$N:$Fq@-, **3.** <-=q$N3HD%$N:$Fq@-, **4.** FCDj$NJ,Ln$N<-=q9=C[$N:$Fq@- JI$NLdBjE@$,$"$k!#0lJ}!"G6aKJCF!"Bg5,LO$J7W;;5!2DFI$J%F%-%9%H!J%3!<%Q%9!K$,BgNL$K=P2skh$&$KJj!"7W;;5!$N@-G=$b8~>e9k$KH<CF!"Bg5,LO%3!<%Q%9$+$i7W;;5!$rMQ$$$F<+F0E*$K8@8lCN<1$r3MF@9kI,MW@-$,<gD%$5lF$-$?!#

8@8l=hM}$G;HMQ$9$k8@8lCN<1$N0lDG$"$k3J%U%l!<%`$O!"9=J82r@O$r9T$&>e$K$*$$$FHs>o$K=EMW$G$"$k!#Bg5,LO%3!<%Q%9$h$j3J%U%l!<%`$r3MF@$9$k;v$rL\E*H7$?4{B8$N8&5f$O!"%3!<%Q%9$NJ8>O$K9=J82r@O$r;\$5$:$K3J%Q%?!<%s$rCj=P$9$k<jK!$KhkbN [Brent93] $H!"9=J82r@O:Q$_$N%3!<%Q%9$+$i3J%U%l!<%`$rCj=P9k<jK!KhkbNKBg$-$/J,1k3H$,=PMh$k!#8e<T$N<jK!$G$O!">pJsM}O@E*>pJsNL$N<jK!$,B?$/MQ$$$i$l!"#18D$N3JMWAG$NHF2=%l%Y%k$N3X=,$r9T$J$&8&5f [Resnik93, Li95] $dJ#?t$N3JMWAGKBP7$FHF2=%l%Y%k$N3X=,$r9T$J$&8&5f [=ULn 95] $,CN$ilF$$$k!#7+7J$,$i!"8=;~E@GO!" (a) B?5A@-N"$kF0;l$NJ#?t$NMQK!$NJ,N$K4X$7$F!"$INh$&$J4QE@hjJ,N`$r9T$J$&$+$H$$$&H=CG$K$D$$$F!"@dBPE*$J4p=`$,B8:_$7$J$$!# (b) I,?\3JdG0U3JKD$$$F!"INh&$J4QE@$GJ,N`$r9T$J$&$+$K$D$$$F$NH=CG$K$D$$$F!"4p=`$,B8:_$7$J$$$!"JI$NM}M3$+$i!"3J%U%l!<%`$N40A4$J<+F03MF@$,<B8=G-$F$$$J$$$N$,8=>u$G$"$k!#

0J>erF'^$($FK\O@J8GO!"7W;;5!$rMQ$$$?3J%U%l!<%`$N40A4$J<+F03MF@$rL\;X$9$N$G$O$J$/!"7W;;5!$K$h$k3J%U%l!<%`3MF@$N7k2L$K$D$$$F!"?M4V$N<j$Khj8!>Z$r9T$$!"7W;;5!$,H=CG$G$-$J$+$C$?ItJ,$d7W;;5!$NH=CG$,8mC?bNG"C?>l9g$K!"?M4V$N<jKhj=$N8m$j$r=$@5$9$k$H$$$C$?!"?M<j$Khk$A`:n$rMF0W$K9T$(kh$&$J;Y1g4D6-$N9=C[$K$D$$$F=RYk!#

2 F0;l$N3J%U%l!<%`$NH><+F03MF@

2.1 4pK\E*$J%"%$%G%"

3J%U%l!<%`$N3MF@$r9T$&>e$G2r7h$9$Y$-LdBj$O!"1~@a$G=R$Y$?$h$&$K!"B?5A@-$N$"$kF0;l$N8l5A$NN`JL$d!"I,?\!&G$0U3J$NJ,N`$J$I$NB>!"%7%=!<%i%9>e$G$N3J$N0UL#@)Ls$NHF2=%l%Y%k$N7hDj$NLdBj$,9M$($i$l$k!#K\O@J8$K$*$$$F$O!":G=i$KF0;l$NB?5A@-N`JL$r7W;;5!$H?M<j$G2r7h$7!"$=$N7k2L$+$iI,?\!&G$0U3J$NJ,N`$H%7%=!<%i%9>e$G$N3J$N0UL#@)Ls$NHF2=%l%Y%k$N7hDj$NLdBj$r2r7h$9$k$3$H$r9M$($F$$$/!#[1] $=$3$G!"F0;l$N3J%U%l!<%`$NH><+F0E*$J3MF@$K$*$$$F!"F0;l$NB?5A@-$NN`JL$r9T$&<jK!$N4pK\E*$J%"%$%G%"$K$D$$$F=RYk!#

$^$$:G=i$K6qBNE*$K!VGc$&!W$H$$$&F0;lKD$$$F9M$($F$_$k!#$^$:!"!VGc$&!W$H$$$&F0;l$O<g$K!V6bA,GbNJIrdj<hj9$k!W$H$$$&0UL#$H!V$"$kIT2w$J46>p$r0z$-5/$3$9!W$H$$$&0UL#$,9M$(il$k!#A0<T$N0UL#$r<h$kH-$NNcJ8$H7F$O!"

!V;~7WrGc&, ?)NHrGc&, 3trGc&, ...!W

JI$,9M$(il!"8e<T$N0UL#$r<hkH$-$NNcJ8$O!"

!V?lTI>rGc&, E\$jrGc&, H?46rGc&, ...!W

JI$,9M$(il$k!#0J>e$NNcJ8$r8+$k$H!"!VGc$&!W$H$$$&F0;l$OA0<T$N0UL#GO!V$r!W3J$KJ*$rI=$9L>;l$r<h$j!"8e<T$N0UL#$G$O!V$r!W3J$K46>p$rI=$9L>;l$r<hk3H,J,$+$k!#D^$j!"!VGc$&!W$H$$$&F0;l$r<h$kNcJ8$r8l5A$KhC$FJ,N`$9$k>l9g$K$O!"!VGc$&!W$K!V$r!W3J$G78<u$1$9$kL>;l$N0UL#$K4p$E$$$FNI$$$H9M$($ilk!#

0J>ehj!"F0;l$NMQNc$K$D$$$F$"$kFCDj$N3J!J0J2<!"$3Nh$&$JFCDj$N3J$r!V<43J!W$H8F$V3HK9$k!#!K$KCmL\$7!"$=$N3J$KBP1~$9$kL>;l$N0UL#%/%i%9$K=>$C$FJ,N`$9$k$H!"E,@Z$KMQNc$NN`JL$,9TolkH?dB,9k3H$,$G$-$k!#

[1] %7%=!<%i%9>eGN3J$N0UL#@)Ls$NHF2=%l%Y%k$N7hDj$NLdBj$O!"3J$N0UL#@)Ls$K4X$7$FE,@Z$J%7%=!<%i%9$,;HMQ$G$-$k$+$I$&$+$K6/$/$/0MB8$7F*$j!"$=Nh$&$J:GE,$J%7%=!<%i%9$,B8:_7J$$$8=;~E@K*$$$F$O40A4$K2r7h9k3HOFq7$$!#$=$3$G!"K\O@J8$G$O8=;~E@$K$*$$$FMF0W$K2r7h$G$-$k$H9M$(il$kF0;l$NB?5A@-N`JL$NLdBj$r<gL\E*H9$k!#

K\O@J8GOF0;l$NB?5A@-$NN`JL$r<gL\E*$H$7$?F0;l$N3J%U%l!<%`3MF@$r0J2<$N<j=g$G9T$&!#$^$:!"7W;;5!KhCFMQNc=89g$N%/%i%9%?%j%s%0$r9TC?8e!"%/%i%9%?%j%s%07k2L$K4p$E$$$F?M<jKh$j3J%U%l!<%`8uJd$rA*Br!&J;9g$r9T$&!#

2.2 MQNc$N%/%i%9%?%j%s%0

$3$3$G!"7W;;5!$KhkMQNc$N%/%i%9%?%j%s%0$K!KD$$$F=RYk!#6qBNNcH7$F!"?^ 1 $NE@@~$G0O$^$l$F$$$kF0;l!VAv$k!W$K$D$$$F$NMQNc$r!V$,!W3J$KCmL\$7$F%/%i%9%?%j%s%0$r9T$&>l9g$rNc$r9M$($k!#$J$*!"?^ 1 $N:8$N?^Nh$&$JL>;l$N%7%=!<%i%9$,4{$KM?$(il$F$$$kH9$k!#

1. =i4|2=

$^$:!"A4FNMQNc$N:G>.HF2=$N3J%U%l!<%`$r9M$(!"$3$N3J%U%l!<%`#18D$+$i@.$k=89g$r!V8=:_$N3J%U%l!<%`=89g!W$H$9$k!#?^ 1 $NNc$G$O!"!V!cJ*!d$,Av$k!W$H$$$&3J%U%l!<%`$,!"E@@~$G0O$^lF$$$kMQNc$N:G>.HF2=$N3J%U%l!<%`$G$"$j!"!V!cJ*!d$,Av$k!W#18D$+$i@.$k=89g$r!"8=:_$N3J%U%l!<%`=89gH9$k!#

2. H?I|

8=:_$N3J%U%l!<%`=89g$h$j#18D$NMWAG$r<h$j=P$7!"!J0J2<!V>e0L$N3J%U%l!<%`!W$H8F$V!K<!$NA`:n$r;\$9!#

$3$3$G!">e0L$N3J%U%l!<%`$N<43J$N3JMWAG$r $Cu$ $H$7!" $Cu$ $N2<0L35G0$N0UL#@)Ls$N%/%i%9$r $Cd, Cd_1, \ldots Cd_k$ $H$7!"0UL#%/%i%9 $Cd_1, Cd_1, \ldots Cd_k$ $r<43J$N0UL#@)Ls$H$9$k3J%U%l!<%`$r!V2<0L$N3J%U%l!<%`!W$H8F$V$3$H$K$9$k!#>e0L$N3J%U%l!<%`$KJq4^$5lkMQNc$N=89g$r2<0L$N3J%U%l!<%`$KJq4^$5$l$kMQNc$N=89gKh$KJ,3d$7$?8e!">e0L$N3J%U%l!<%`$r8=:_$N3J%U%l!<%`=89g$h$j=|$-!"2<0L$N3J%U%l!<%`$r2C$($k!#

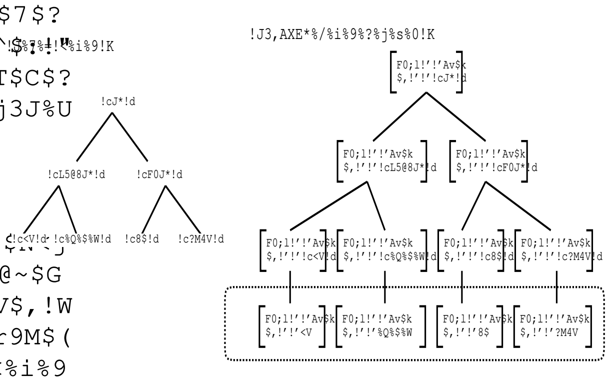
$3$3$G!"!V!cJ*!d$,Av$k!W$r<h$j=P$7$?>l9g$K$D$$$F9M$($k$H!"$^$:!"!V$,!W3J$N3JMWAG$N!cJ*!d$N2<0L%/%i%9$O!"%7%=!<%i%9hj!"!cL5@8J*!d$H!cF0J*!d$JNG!"!V!cJ*!d$,Av$k!W$N2<0L$N3J%U%l!<%`$H$7$F!V!cL5@8J*!d$,Av$k!W$H!V!cF0J*!d$,Av$k!W$,$G$-!"!V!cJ*!d$,Av$k!W$KJq4^$5$l$kMQNc$N=89g$r$=$l$>$l!V!cL5@8J*!d$,Av$k!W$H!V!cF0J*!d$,Av$k!W$KJq4^$5$l$kMQNc$N=89g$KJ,3d$9$k!#$=$7$F!"8=:_$N3J%U%l!<%`=89ghj!V!cJ*!d$,Av$k!W$r=|$-!"!V!cL5@8J*!d$,Av$k!W!V!cF0J*!d$,Av$k!W$r2C$($k!#

3. Dd;_>r7o

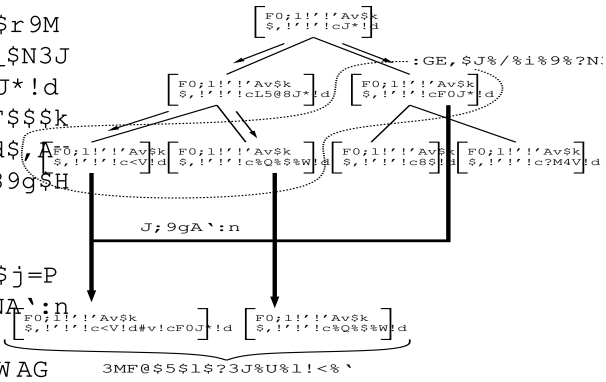
A0=R$NH?I|A`:n$O!"MQNc$N%/%i%9%?%j%s%0$N3,AX?t$,MU%/%i%9$K6a$$%7%=!<%i%9$N3,AX$N?<$5Dx$EY$K?<$/$J$k$+!"8=:_$N3J%U%l!<%`=89gCf$NA4FN3J%U%l!<%`$G!"$=l,Jq4^9kMQNc?t$,#10J2<$HJC$?>l9g$KDd;_9k!#

2.3 ?M<jKh$k3J%U%l!<%`8uJd$NA*Br!&A`:n

7W;;5!KhCF3,AX*$K9T$ol?%/%i%9%?%j%s%07k2L$r4p$K!"?M<jKh$j3J%U%l!<%`$N:GE,$JHF2=$3$3



?^ 1: MQNc$N%/%i%9%?%j%s%0$NNc



?^ 2: 3J%U%l!<%`A`:n$NNc

%l%Y%k$rA*Br$7!"F1$88l5A$NF0;l$r;}$D3J%U%l!<%`F1;N$rJ;9g$9$k!#$3$3$G$O!"Nc$H$7$F 2.2 @a$N3,AXE*%/%i%9%?%j%s%0$r$b$H$KF0;l!VAv$k!W$r!VJ*$,9bB.$KF0$/!W$H$$$&8l5A$H!V2?$+$,@~>u$K1d$S$k!W$H$$$&8l5A$KN`JL9k3H$r9M$($k!#

1. =`Hw

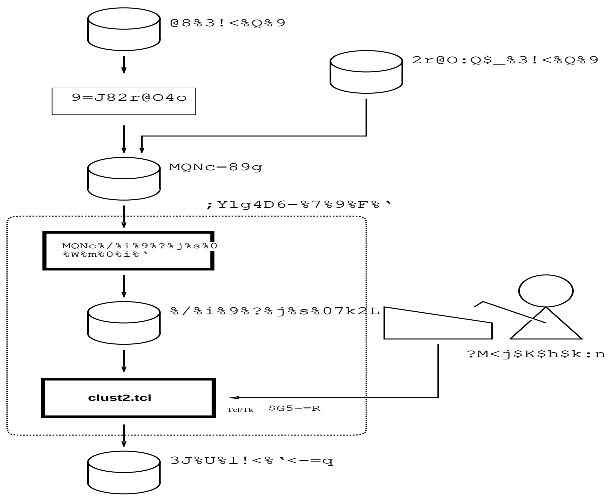
$^$:!"M?$($il?F0;lKD$$$F!"$=$NF0;l$,<+F0;l$+B>F0;l$+$JIr9MN8$7!"3J%U%l!<%`3MF@$N>e$G!":G$bE,Ev$G$"$k$H9M$($i$l$k<43J$r#18DA*$S!"$=$N<43J$K$h$k%/%i%9%?%j%s%07k2L$N:G>e0L$N3J%U%l!<%`#18D$+$i@.$k=89g$r3J%U%l!<%`8uJd$N=89g$H$9$k!#F0;l!VAv$k!W$NNc$r9M$($k$H!"F0;l$,<+F0;l$G$"$k$3$H$J$I$r9MN8$7$F!V$,!W3J$r<43J$H$9$k$N$,E,Ev$G$"$k$H9M$($i$l$k!#$=$7$F!"!V!cJ*!d$,Av$k!W$+$i$J$k=89g$r3J%U%l!<%`8uJd$N=89gH9$k!#

2. 3J%U%l!<%`$N:GE,$JHF2=%l%Y%k$NA*Br

<!$N<j=g$K=>$$!"3J%U%l!<%`Cf$N3JMWAG$NE,@Z$JHF2=%l%Y%k$r7hDj9k!#

$^$:!"3J%U%l!<%`8uJd$N=89g$h$j!"E,@Z$J#18D$N3J%U%l!<%`$rA*$S!"$=$N3J%U%l!<%`$KJq4^$5$l$kMQNc$N=89g$r8+$k!#MQNc=89gCf$NA4MQNc$NF0;l$,!"F1$88l5A$K$h$C$F;HMQ$5$l$F$$$k$H$H=CG$G$-$k>l9g$O!"3J%U%l!<%`r=N^$^$K$7!"$=$&$G$J$$>l9g$O!"$=$N3J%U%l!<%`$r2<0L$N3J%U%l!<%`$KJ,3d$7!"3J%U%l!<%`8uJd$N=89g$+$i$=$N3J%U%l!<%`$r=|$-!"2<0L$N3J%U%l!<%`$rDI2C$9$k!#

$3$3$G!"F0;l!VAv$k!W$N>l9g$N:n6H$N2aDx$K$*$$



?^ 3: ;Y1g4D6-$N%7%9%F%`9=@.?^

$F!"!V!cL5@8J*!d$,Av$k!W$H$$$&3J%U%l!<%`$rMM$+ $k$H!"$3$l$KJq4^$5$l$kMQNc$O!V<V$,Av$k!W!V%Q%$ %W$,Av$k!W$G!"$3$l$OA0=R$N#28D$N!VAv$k!W$N8l5A $,:.:_$7$F$$$k$HH=CG$5$l$k$N$G!"$3$N3J%U%l!<%` $O2<0L$N3J%U%l!<%`$KJ,3d$9$k!#0lJ}!"!V!cF0J*!d $,Av$k!W$H$$$&3J%U%l!<%`$O!V8$$,Av$k!W!V?M4V$, Av$k!W$H$$$&MQNc$rJq4^$7!"3liO$$$:lN!VAv $k!W$b!VJ*$,9bB.$KF0$/!W$H$$$&8l5AG"kN$G!" 3N3J%U%l!<%`O3$l0J>e$NJ,3drdak!#

0J>e$NA`:n$r!"MQNc=89gCf$NA4MQNc$NF0;l$,F1$8 8l5AKhCF;HMQ5l$F$$$k$HH=CG$G$-$k$^$G7+$j 9k!#

3. F1$88l5A$N3J%U%l!<%`$NJ;9g

2. $NA`:n$GA*Br$5$l$?:GE,$JHF2=%l%Y%k$N3J%U %l!<%`$K$D$$$F!"F0;l$,F1$88l5A$r;}$D3J%U%l!<%` F1;N$rA*8@1i;;$KhjJ;9g9k!#F0;l!VAv$k!W$NNc $G!":GE,$JHF2=%l%Y%kH7$F?^ 2 $NE@@~$G0O$^$l$? bN$,5aail?>l9gGO!"!VJ*$,9bB.$KF0$/!W$H 8@$&8l5A$GMQ$$$ilF$$$k!V!cF0J*!d$,Av$k!W!V!c <V!d$,Av$k!W$rJ;9g$7$F!V!cF0J*!d ∨ !c<V!d$,Av $k!W$H9k!#

3 ;Y1g4D6-$N9=C[

K\@aGO!"3J%U%l!<%`3MF@N?aN;Y1g4D6-$N35 N,$K$D$$$F=RYk!#

3.1 %7%9%F%`9=@.

;Y1g4D6-$N%7%9%F%`9=@.$K$D$$$F$NA4BN?^$r?^ 3 $K<($9!#$^$:!"Bg5,LO$J%3!<%Q%9$r9=J82r@O$7$?J* 5Z$S!"2r@O:Q$N%3!<%Q%9$+$i!"F0;l$N6&5/MQNc$N=8 9g$r<h$j=P$7!"$=$NMQNc=89g$rMQNc$N%/%i%9%?%j%s %0%W%m%0%i%`$KF~NO$7!"3,AXE*$J%/%i%9%?%j%s%07k 2L$r5a$a$k!#$3$N7k2L$rF~NOH7$F!"#G#U#I4D6-$N %$%s%?!<%U%'%$%9!JTcl/Tk $G:n@.!K$r5/F0$7!"$3 lrDL8F?M<jKh$k:n6H$r9T$$!"3J%U%l!<%`$r3M F@$9$k!#

I= 1: 3J%U%l!<%`3MF@$N<B837k2L!JH4?h!K

F0;l	8l5A?t	<43J	step	HF%/	J;%/	4~5Q
?(lk	6	$K	16	54	5	4
F0$/	6	$,	21	70	6	20
<h$k	19	$r	30	102	14	32
2!$9	5	$r	12	29	4	5
D%$k	12	$r	15	47	9	4
	–	$,	3	7	1	5

3.2 %$%s%?!<%U%'%$%9$N5!G=

;Y1g4D6-K*1k#G#U#I4D6-%$%s%?!<%U%'%$%9$K $D$$$F!"354Q$r?^ 4$K<($9!#;Y1g4D6-$K$*$1$k#G#U #I4D6-%$%s%?!<%U%'%$%9$O!"<!$K5s$2$k5!G=$,$" $k!# **1.** 3J%U%l!<%`$NI=<(!"1\Mw5!G= (?^ 4 $N:8>e ?^), **2.** 3J%U%l!<%`$KJq4^5l$kMQNc$NI=<(!"1\Mw 5!G= (?^ 4 $N:82<?^), **3.** 3J%U%l!<%`$N=$@5!"A`:n 5!G= (?^ 4 $NCf1{?^), **4.** %7%=!<%i%9$N0UL#%/%i%9 $NM=q0z$-7k2L$NI=<((?^ 4 $N1&2<?^)

4 3J%U%l!<%`$NH><+F03MF@$N<B83

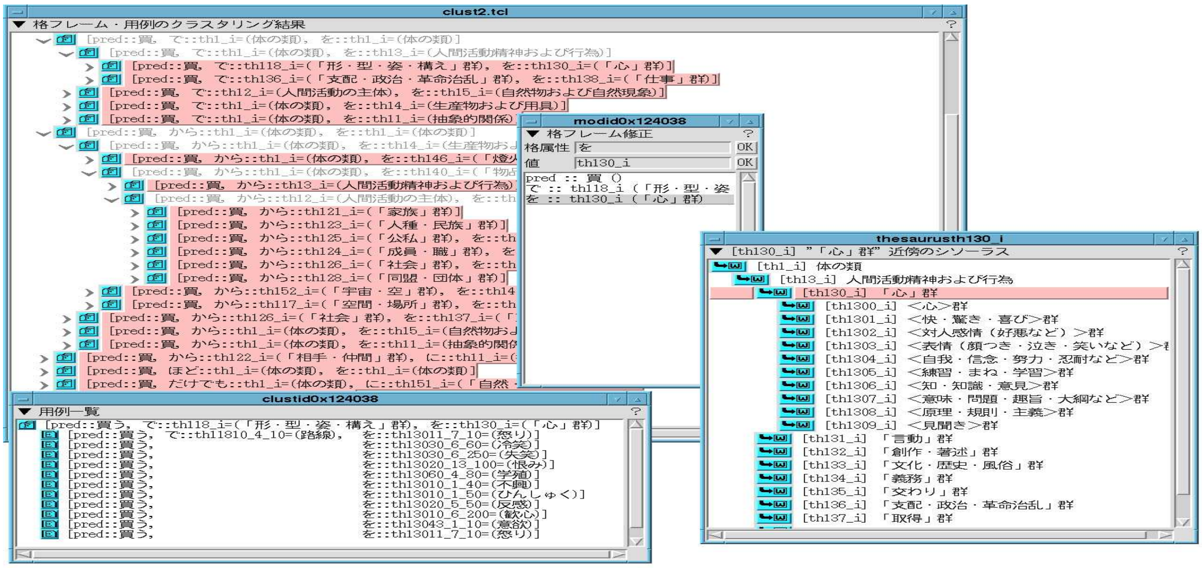
K\@aGO!" 3 @a$N;Y1g4D6-$rMQ$$$F!"3J%U%l!<%` $NH><+F03MF@$r9T$&<B83$K$D$$$F=RYk!#

4.1 <B83

K\<B83K*$$$F$O!"%7%=!<%i%9$H7FJ,N`8lWCI= [9q8& 64] $r;HMQ$7!"MQNc$rCj=P$7$?%3!<%Q%9$K$D $$$F$O!"9=J82r@O:Q$N%3!<%Q%9G"$k EDR $NF| K\8l6&5/<-=q [EDR95] $+$i!"=P8=IQEY 50 2s0J >e$NF0;l 835 8D$K$D$$$FF0;l!&3JMWAG$N6&5/$r9g 7W 153,014 8DCj=P7?bN$rMQ$$$?!#3NCf$+$i!" 20 8D$NF0;l$rCj=P$7!"6&5/MQNc$N%/%i%9%?%j%s%0 $r9T$C$?!#$=$N7k2L$r!"#G#U#I4D6-%$%s%?!<%U%'%$ %9$rMQ$$$F!" 2.3 @a$N<j=g$K=>$$!"3J%U%l!<%`$N8u Jd$r7hDj$7!"J;9gA`:n$r;\$7$?!#$3$3$G!"F0;l$NMQ K!$*hS!"8l5AKD$$$FH=CG$r2<$7$?4p=`$O!"F|K\ 8l4pK\F0;lMQK!<-E5 [>.@t 91] $rMQ$$$?!#3N<-E5 $O!"F|K\8l$N4pK\F0;l 728 8DKD$$$F!"8l5A!&MQ K!!&J8K!>pJsEy$,5-=R$5lF$$$k!#

4.2 <B837k2L

20 8D$NF0;l$N$&$A$N 5 8D$K$D$$$F$N%/%i%9%? $NE83+2s?t$H!"Am%/%i%9%??t$rI= 1 $K<($9!# I= 1 GO!"!VF0;l!WMs$K<B83$r9TJC$?F0;l$r!"!V8l 5A?t!WMs$O!"F|K\8l4pK\F0;lMQK!<-E5$K5-=R$5lF $$$?8l5A$N8D?t$r<($7!"!V<43J!WMs$K!"$=$NF0;l$K $*$$$F3J%U%l!<%`3MF@$K:G$bE,@Z$G$"$k$HH=CG$5 $l$?<43J$r<($7$?!#$^$?!"!Vstep!WMs$K$O:GE,$J3J %U%l!<%`$NHF2=%l%Y%k$rA*Br9kNKI,MW$J%/%i%9 %?$NE83+?t$r!"!VHF%/!WMs$K:GE,$J3J%U%l!<%`$NHF 2=%l%Y%k$KJ,3d$5$l$?;~$N%/%i%9%??t$r<($9!#$=$7 $F!"!VJ;%/!WMs$KJ;9gA`:n8e$N%/%i%9%??t$r<($7!" !V4~5Q!WMs$KJ;9gA`:n;~$K4~5Q7?%/%i%9%??t$r<(



?^ 4: #G#U#I4D6-%$%s%?!<%U%'%$%9$N304Q

$9!#$J$*!"F0;l!VD%$$k!WKD$$$F$O!"<43J$r!V$l!W3J$K@_Dj7?$@$1GO!VI9$,D%$k!W$H$$$&Nc MQ5l$k8l5A$,E,@Z$KCj=P$G$-$:!"b&0l$D!V 3J$r<43J$K@_Dj$7$FA`:n$r9T$&I,MW$,$"$C$?$?$a !V$r!W3J$H!V$,!W3JKh$k<B837k2L$rJ;5-7?!#

4.3 9M;!

$^$:!"3J%U%l!<%`$N:GE,$JHF2=%l%Y%kA*Br$N<B83$K$*$$$F$O!"3J%U%l!<%`8uJd$NA*Br$GCmL\$9$k3J$r#18D$K8GDj$9$k<jK!$rMQ$$$?$,!"$3$N<jK!$K$*$$$F0lIt$NF0;l$r=|$$$F!"$[$\M-8z$KF0;l$N8l5A$rCj=P=PMh$F$$$k3H$,J,$+C?!#7+$7!"F0;l!VD%$k!W!V$+$+$k!W!V>e$2$k!W!V0z$/!WKD$$$F$O#18D$N<43J$r@_Dj$7$?$@1G$O8l5A$,E,@Z$KCj=P$G$-$:!"9M?t$N<43J$r@_Dj9kI,MW$,$"C?!#

$=$7$F!"K\O@J8$GDs0F7?<jK!Kh$j!"F0;l$K78$k3JMWAG$KBP1~9kL>;l$N:GE,$JHF2=%l%Y%k$NA*Br$N:n6H$r!"!VMQNc=89gCf$NA4MQNc$NF0;l$O9Y$FF1$88l5A$+$I$&$+!W$H$$$&FsCME*$JH=CG:n6H$KhC$F9T$&3H$,2DG=$HJj!"=>Mh$N3J%U%l!<%`<-=q$N9=C[:n6H$HHf3S$7$F!"O+NO$,7Z8:5lk3H,<(5l$?!#

5 $*$ojK

K\O@J8GO!"3J%U%l!<%`$rH><+F0E*$K3MF@$9$k$?$a$N;Y1g4D6-$N9=C[$K$D$$$F=R$Y$?!#$=$3$G$O!"MQ:Q%3!<%Q%9$h$j<h$j=P$7$?MQNc$r#18D$N<43J$KCmL\$7$J$,$i!"3,AXE*$K%/%i%9%?%j%s%0$r9T$$!"$=$N%/%i%9%?%j%s%0$N7k2L$r4p$K?M<j$K$h$jF0;l$NB?5A@-$rN`JL$r<g4c$H7F3J%U%l!<%`$N3MF@$r9T$C$?!#$=$7$F!"3J%U%l!<%`$NH><+F03MF@$N<B83$r9T$C$?7k2L!"Ds0F$7$?<jK!$KhkF0;l$NB?5A@-N`JL$NM-8z@-$r3NG'$7$?!#

:G8e$KK\8&5f$N:#8e$N2]Bj$K$D$$$F=RYk!#

1. 3J%U%l!<%`<-=q$NBEEv@-$NI>2A ... <B83$K$h$C$E9=C[$7$?3J%U%l!<%`<-=q$r!"8=<B$N9=J82r@O$K;HMQ$7$?>l9g$N2r@O@-G=KD$$$FI>2A$r2C$($k!#
2. ?M<j$NH=CG7k2L$N:FMxMQKD$$$F$N8!F$ ... 0.A0$K9T$C$?:GE,$JHF2=%l%Y%kA*BrK*1k?M<j$NH=CG7k2L$r!"8e$K9T$&HF2=%l%Y%kA*Br$NH=CG$K$*$$$F!"2?i+$N7A$G;2>H$7MxMQ$9$k5!9=$N<BAuJIKD$$$F8!F$$r2C$($k!#

J*!"K\8&5f$O!VIPA AOB$E*%=%U%H%&%'%"0i@.5;=Q!W$N8&5f;Y1g$N0l4DH7$F9T$C$?$bNG$"$k!#

; 29MJ88%

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[>.@t 91] >.@t J], A%>k DLM:, K\ED>=<#, ?NED 5AM:, DMK\=(<y:FL!K\8l4pK\F0;lMQK!<-E5, Bg=$4[=qE9, (1991).

[9qN) 64] 9qN)9q8l8&5f=j: J,N`8lWCI=, =(1Q=PHG, (1964).

[=ULn 95] =ULn 2mI': :G>.HF2=$H%*%C%+%`$N86M}$rMQ$$$?F0;l3J%U%l!<%`3X=,, >pJs=hM}3X2q8&5fJs9p, *Vol. 95, No. 69 (95–NL–108)*, pp. 29–36 (1995).