



o

ZRUGV

UDILVK GHYHORSPHQW GLVDELOLW\ WKHUDS\ PHFKDQLVP

PDO W\SHV /LIH VWDJHV

UD ILVK HPEU\R MXYHQLOH DGXOW SUHJQDQW

HWURVSHFWLYH DVVHVVPHQW

H 6HFUHWDU\ RI 6WDWH KDV GHWHUPLQHG WKDW D UHWURVSHFW

EMHFWLYHV DQG EHQHILWV

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'HVFULSWLRQ RI WKH SURMHFWV REMHFWLYHV IRU H[DPSOH  
VFLHQWLILF QHHGV LW V DGGUHVVLQJ

:KDW LV WKH DLP RI WKLV SURMHFW"

7KLV SURMHFW DLPV WR LQFUHDVH RXU XQGHUVWDQGLQJ RI  
WKDW FDXVH WKRVH GLVHVVHV DV ZHOO DV SURYLGLQJ GLV  
GHYHORSHPHQW

3RWHQWLDO EHQHILWV OLNHO\ WR GHULYH IURP WKH SURMHF  
RU KRZ KXPDQV DQLPDOV RU WKH HQYLURQPHQW PLJKW EHG  
ZLWKLQ WKH GXUDWLRQ RI WKH SURMHFW RU ORQJ WHUP EHC

:K\ LV LW LPSRUWDQW WR XQGHUWDNH WKLV ZRUN"

7KH SURMHFW IRFXVHV RQ UDUH LQKHULWHG GLVHVVHV ZKL  
HYHQ WKRXJK HDFK GLVHVVHV KDV DQ LQFLGHQFH RI OHVV WI  
SUHPDWXUH GHDWK LQ FKLOGKRRG DQG WKH YDVW PDMRULW  
GLVHVVHV WKDW KDYH D PRUH FRPSOH[ RULJLQ LQ ZKLFK W  
HQYLURQPHQWDO IDFWRUV 7KHUH LV D KXJH QHHG WR ILQG

:KDW RXWSXWV GR \RX WKLQN \RX ZLOO VHH DW WKH HQG RI

:H H[SHFW WR KDYH LQFUHDVHG RXU XQGHUVWDQGLQJ RI WK  
FKLOGKRRG QHXURGHJHQHUDWLRQ DQG HSLOHSV\ LQFOXGL  
RWKHU SURFHVVHV ZLWKLQ WKH FHOODQG KRZ GLVHVVHV DU  
DQG E\ VWXG\LQJ WKHP ZH ZLOO EHWWHU XQGHUVWDQG WKH  
WHVWHG WR VHH LI WKH\ WUHDW DQ\ RI WKH FKLOGKRRG QH)  
ZLOO SXEOLVK RXU ILQGLQJV :H ZLOO DSSO\ IRU RUSKDQ GI  
FKLOGKRRG QHXURGHJHQHUDWLYH GLVHVVHV FDOOHG &/1 GL  
GHVLJQDWLRQV RU SDWHQWV IRU SRWHQWLDO GUXJV

:KDW ZLOO EH WKH LPSDFW RI WKLV SURSRVHG ZRUN(:H

W GU@@RPO I P SP@@RPO ISDFX@@Y€ VZQpUDWK WPSD U°0ZU`



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7R XQGHUVWDQG WKH GLVHDTVH PHFKDQLVPV ZH VRPHWLPHV  
HLWKHU XVLQJ SKDUPDFRORJLFDQ DJHQWV RU E\ DOWHULQJ  
KDV PDGH D GLIIHUHQFH :H FDQ H[DPLQH WKHLU PRYHPHQW  
KDSSHQLQJ ZLWKLQ ZKLFK ZH YLVXDOLVH ZLWK D ODEHO R  
ILVK WKDW KDYH EHHQ VDFULILFHG IRU WKHLU WLVVXH

7R VHDFK IRU WUHDWPHQWV ZH XVH HPEU\RQLF GLVHDTVH P  
FKHFN WR VHH LI WKH VLJQV RI WKH GLVHDTVH DUH UHGXFHG  
,I ZH DOUHDG\ KDYH JRRG UHDVRQ WR EHOLHYH WKDW D FKH  
FHOOXODU GLVHDTVH PRGHQV ZH PLJKW XVH DGXOW GLVHD\  
PRGHQV ILUVW LI SRVVLEOH ,Q WKLV FDVH ZH PLJKW EDWKH  
VLPLODU WR WKRVH RI RXU FROODERUDWRUV WKDW KDYH PR  
ZH FDQ EH PRUH FRQILGHQW WKDW WKH WUHDWPHQW ZLOO E  
PHFKDQLVP LV FRQVHUYHG ALVP0€

- .LOOHG
- 8VHG LQ RWKHU SURMHFWV

## 5HSODFHPHQW

6WDWH ZKDW QRQ DQLPDO DOWHUQDWLYHV DUH DYDLODEOH  
FRQVLGHUHG DQG ZK\ WKH\ FDQQRW EH XVHG IRU WKLV SXUS

:K\ GR \RX QHHG WR XVH DQLPDOV WR DFKLHYH WKH DLP RI \

7R PRGHO D GLVHDVH LQYHVWLJDWH WKH SDWKRORJLFDO V\  
\RX QHHG DOO WKH UHOHYDQW WLVVXH SUHVHQW 7KH GLVI  
QHUYRXV V\ VWHP EXW WKHUH LV LQFUHDVLQJ HYLGHQFH WKI  
KH DUW DQG ZH NQRZ WKDW WKH PXWDWHG SURWHLQV IXQFW  
RWKHU WLVVXH LI ZH PDQDJH WR WUHDW WKH EUDLQ DQG L  
GLVHDVHV LW LV NQRZQ WKDW SDWLHQWV JHQHUDWH DQWLI  
+HQFH D IXOO XQGHUVWDQGLQJ RU WKH GLVHDVH DQG WUHI

:KDW ZDV \RXU VWUDWHJ\ IRU VHDFKLQJ IRU QRQ DQLPDO D

:H HPSOR\ UHSODFHPHQW VWUDWHJLHV ZKHUH SRVVLEOH 7K  
PRGHOV WUDGLWLRQDOO\ XVHG PDPPDOLDQ FHOOV SDWLHC  
LQYHUWHEUDWHV VXFK DV WKH IUXLW IO\ DQG WKH QHPDWR  
GSHQGLQJ RQ WKH DYDLODELOLW\ RI VXLWDEOH PRGHOV R  
PXWDWHG :H DOVR WDNH WLVVXH IURP FXOOHG ]HEUDILVK D

:K\ ZHUH WKH\ QRW VXLWDEOH"

7KHVH PHWKRGV GR QRW UHSOLFDWH WKH FRPSOH[ HQYLURC  
DW SRVW HPEU\RQLF VWDJHV EXW WKH\ GR JLYH XV VRPH LQ  
ZKDW H[SHULPHQWV VKRXOG EH SHUIRUPHG LQ ]HEUDILVK DV

## 5HGXFWRQ

([SODLQ KRZ WKH QXPEHUV RI DQLPDOV IRU WKLV SURMHFW ;  
EHHQ WDNHQ WR UHGXFH DQLPDO QXPEHUV DQG SULQFLSOH  
WKDW DUH XVHG WKURXJKRXW WKH SURMHFW WR PLQLPLVH C  
DQ\ 7KHVH PD\ LQFOXGH H J SLORW VWXGLHV FRPSXWHU PI

+RZ KDYH \RX HVWLPDWHG WKH QXPEHUV RI DQLPDOV \RX ZL

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:H H[SHFW WR XVH XS WR RI WKHVH ILVK IRU EUHHGLQJ S  
7KLV LV EDVHG RQ GLIIHUHQW VWUDLQV VRPH DUH FRPELQ  
LQWHUPHGLDWH VWUDLQV QHHG WR EH JHQHUDWHG ZLWK Q  
=HEUDILVK DUH KHDOWKLHU ZKHQ LQ JURXS RI RU PRUH  
PRQWKV WKH ROG JHQHUDWLRQV DUH QRW FXOOHG XQWLO  
)RU VRPH FRPSOH[ VWUDLQV RQO\ D VPDOO SURSRUWLRQ RI



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7KH PDMRULW\ RI DQLPDOV ZLOO EH PDLQWDLQHG DV QRQ KI





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:H ZLOO XVH WKH OHDVW KDUPIXO PHWKRG IOXRUVFHQW PI  
RIIVSULQJ DV REVHUYHG WKURXJK PLFURVFRS\ GXULQJ XQUH  
:KHQ WLVVXH VDP SOHV DUH UHTXLUHG ZH ZLOO SUHIHUHQW  
WKHVH PHWKRGV XVH DQDHWVWKHVLD ZLWK UHFYHU\ EXW VI  
UHFHQWO\ EHJXQ XVLQJ VNLQ VZDEV DQG ZLOO QHHG WR VK  
ZLWK ILQ FOLSV IRU HDFK VWUDLQ EHIRUH ZH FDQ XVH VNLQ  
ILQ VDP SOHV

:H DLP WR WULDO JHQRW\SLQJ HPEU\RV GSI XVLQJ WKH =H  
UHPRYHV FHOOV IURP WKH VNLQ IRU JHQRW\SLQJ )LVK DUH  
KDYLQJ KDG DQ LQYDVLYH JHQRW\SLQJ PHWKRG

7KH SURWRFROV VWDWH WKH PLQLXP UHTXLUHG PRQLWRUL  
UHVSRQG GLIIHUHQWO\ WKDQ QRUPDO WR WKH SURFHGXUH

:KDW SXEOLVKHG EHVW SUDFWLFH JXLGDQFH ZLOO EH IROOR  
PRVW UHILQH ZD"

:H ZLOO IROORZ +RPH 2IILFH JXLGDQFH )RU SXEOLVKHG PHV  
UHILQH PHWKRG LV EHLQJ IROORZHG EHIRUH LPSOHPHQWDV  
\$QLPDO &DUH DQG :HOIDUH 2IILFHU DQG SRVVLEO\ WKH 1DPH

+RZ ZLOO \RX HQVXUH \RX FRQWLQXH WR XVH WKH PRVW UH  
SURMHFW"

:H VHHN DGYLFH IURP ODUJH ]HEUDILVK IDFLOLWLHV DQG NH  
\$VVRFLDWLRQ RI \$QLPDO +XVEDQGU\ WKH (XURSHDQ =HEUDI  
\$VVRFLDWLRQ WKH 1& 5V WKH ,QVWLWXWH IRU \$QLPDO 7HFI  
QH ZVOHWWHUV DQG EXOOHWLQV IURP WKHVH JURXS :H VHI  
FRPPLWWHH PHPEHU IRU (8)LVK%LRPHG PHPEHUV RI ZKLFK K

:H KDYH PHHWLQJV HYHU\ IHZ PRQWKV ZLWK RWKHU UHVHDF  
ILVK DQG SUHVHQW RXU UHVHDFK VR WKH\ FDQ IHG EDFN I

:H ZLOO NHHS XS WR GDWH ZLWK FKDQJHV LQ WKH \$55,9( JXI  
H[SHULPHQWDWLRQ

:KHQ ZH ILQG D QHZ PHWKRG ZH EHOLHYH WR EH EHVW SUDF  
WUDLQLQJ

([SODLQ WKH FKRLFH RI VSHFLHV DQG WKH UHODWHG OLIH V)

'DWD IURP ]HEUDILVK FDQ EH H[WUDSRODWHG WR RWKHU YHU  
SDUWLFXODU\ ELRFKHPLFDO FHOOXODU DQG GHYHORSPHQ  
VLPLODU 7KLV PHDQV WKDW LW LV YDOLG WR XVH WKH ]HEU  
PHFKDQLVPV DQG VHDFK IRU DQG WHVW QRYHO WUHDWPHQ\  
IRU LQKHULWHG QHXURGHJHQHUDWLYH GLVHDFHV DQG HSLO

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WKH JHQH LV IURP ]HEUDILVK WR KXPDQV 7KH UDSLQ H[WHL  
PDMRULW\ RI H[SHULPHQWV WR EH SHUIRUPHG DW GHYHORSP  
2IILFH ZLWKRXW KDUPLQJ WKH PRWKHU 7KXV ZH IHHO WKDW  
PRGHO IRU RXU UHVHDUFK DQG WKDW RI WKH DYDLODEOH YI