



IEST7400

9bj]fcba YbHJ`A UbU[Ya Ybh`GcWU`GWYbWY
: i bXUa YbHJ`g

GYa YghYf`Hk c`#`&\$%

7 ci fgY`Cj Yfj]Yk

GHUZZ7cbhUWh8YHU]g`

7cbj Ybcfg`

B Ua Y	9a U]	5j U]UV]m	@cWUhc b	D\cbY
DUi ``6fck b	dUi ``Vfck b4 i bgk "YXi "Ui	9a U]`WcbhUWh dfYZffYX"A YYh]b[g VmUddc]bha Ybh	A cfj Yb`6fck b 6i]X]b[" A 6' *)	\$(%' ,)) +\$

GWXcc`7cbhUWh`bZcfa Uh]cb

GWXcc`cZ<i a Ub]h]Yg`UbX`@Ub[i U[Yg

@cWUhc b. GWXcc`C Z]WZ`A cfj Yb`6fck b`6i]X]b[ž@Yj Y`&ž&),

C dYb]b[`<ci fg. A cbXUm! : f]XUmž - Ua !') da

D\cbY. ž*%&-' ,) `*% , %

: U! . ž*%&-' ,) , +\$)

9a U]: [\U`4 i bgk "YXi "Ui](#)

5 hYbXUbW`F Yei]fYa Ybhg

5`gh XYbh]g`YI dYW`X`hc`U`hYbX`U`WUgg`WcbhUWh\ci fg`Zcf`U`Z]W!hc!Z]W`fi &: E`cf`V`Yb`XYX`Wci fgY`UbX`Wca`d`YH`U`U`WU]j`h]Yg`Zcf`U`V`Yb`XYX`cf`Z`mcb`]bY`Wci fgY"

5`gh XYbhk \c`Uff]j Yg`a`cfY`h`Ub`%)`a`]bi`hYg`U`H`a`UmVY`d`Yb`U`]gYX`Zcf`bcb!U`hYbXUbW`"Zgi`W`U`d`Yb`U`m`]g`]a`d`cgYXž`h`Y`gh`XYbhia`i`ghVY`]b`Zcfa`YX`j`YfVU`m`Uhi`h`Y`YbX`c`Z`WUgg`UbX`UXj`]gYX`]b`k`f]h]b[`k`]h`]b`&(`\ci fg"

Z`U`gh`XYbhYI`dYf]YbW`g`]`bYggž`a`]gUXj`Ybh`fY`cf`ch`Yf`c`W`ffYbW`h`Uha`U`Yg`UVgYbW`Zcfa`U`WUgg#UW]j`]mi`bUj`c]XUV`Yž`cf`YI`dYW`g`hc`VY`UVgYbhiZcfa`U`Zc`f`h`Wca`]b[`WUgg#UW]j`]mž`h`Y`m`g`l`ci`X`g`YY`_`dYfa`]gg]cb`Zcfa`h`Y`7`ci`fgY`5i`h`cf]mž`UbX`k`YfY`Udd`]WUV`Yž`h`Y`f`f`Yei`Ygh`g`l`ci`X`VY`UVWca`dUb]YX`VmUb`cf][`]b`U`cf`W`f]j`YX`W`dmc`Z`U`a`YX]W`W`f]j`WU`h`cf`ch`Yf`Zcfa`c`Z`Udd`f`d`f]U`h`Y`j`]X`Y`b`W"

5`7`ci`fgY`5i`h`cf]`ma`UmYI`W`gY`U`gh`XYbhZcfa`WUggYg`cf`UW]j`h]Yg`Zcf`i`d`hc`cbY`a`cbh`<`ck`Yj`Yfž`h`Y`m`a`UmUgg][`b`UXX]h]cbU`UbX`#`f`U`h`f`b`U`h]j`Y`hUg`_`g`hc`Ybgi`fY`Wca`d`]UbW`"5`7`ci`fgY`5i`h`cf]`m`Wcbg]XYf]b[`h`Y`[`f`Ub]h]b[`c`Z`UVgYbW`a`i`ghVY`g`U`h]g`Z`YX`U`gh`XYbhk`]`g`h`VY`UV`Y`hc`a`YYh`h`Y`Wci`fgY`g`Y`Ufb]b[`ci`h`Wca`Yg`UbX`#`f`]`ci`a`Y`c`Z`Y`Ufb]b["5`gh`XYbhg`YY_]b[`Udd`f`c`j`U`hc`VY`UVgYbhiZcfa`cfY`h`Ub`cbY`a`cbh`a`i`ghUdd`m`]b`k`f]h]b[`hc`h`Y`8`Y`Ub`UbX`d`f`c`j`]X`Y`U`c`f][`]b`U`cf`W`f]j`YX`gi`dd`f`h]b[`XcW`a`Y`b`h]cb"

:`cf`a`cfY`]b`Zcfa`Uh]cb`UVci`h`h`Y`U`hYbXUbW`d`f`c`hc`W`g`]b`h`Y`:`UW`m`ic`Z`5`f`g`UbX`Gc`W]U`GWYbW`g. [\hdg`##`k`k`"Uf`g`i`bgk`"YXi`"Ui`#W`ffYbhgh`XYbhg#UW\]jYa`_W\]bZcfa`Uh\]cb#d`f`c`hc`W`g`l`i`\]X`Y`\]bYg#](#)

5 WUXYa]W`bZcfa Uh]cb`

: cf`YggYbh]U`gh XYbh]bZcfa Uhcb`fY`Uh]b[`rc.`fYei Ygrg`Zcf`YI hYbg]cb/fYj]Yk`cZa Uf_g/cVW dUhcbU`\\YU`h
UbX`gUZ`hm/YI Ua]bUhcb`dfcW`Xi fYg/gdYW]U`Wcbg]XYfUhcb`]b`h`Y`Yj YbhcZ]`bYgg`cf`a]gUXj Ybh fY/
gh XYbhYei]mUbX`X]gUV]`]m/UbX`ch`Yf`YggYbh]U`UWXYa]W]bZcfa Uhcbž
gYY`[\hdg.#k.k"Ufng"i bkg "YXi "Ui #W ffYbhgh XYbng#UWXYa \]W\]bZcfa Uhcb#dfcfcW`g!\[i \]XY`\]bYg#](#)

7ci fgY'8YHU]`g

7fYX]hDc]bHg`*`

Gi a a UfmicZ\hY'7ci fgY

H\Y'gcWU`gWYbWg'd'UmU'bhY[fU'fc'Y'j'W'ca dfY\Ybg]j Y'Ybj]fcb a YbHU`a UbU[Ya Ybh'UbX'hY]f
]a dcfU'UbW' \Ug'VYb'fY'Wc[b]gYX'j'b'fY'W'bh'mY'Ufg" H\]g'W'ci fgY'YI d'U]bg'hY'gcWU'z'dc`h]WU`UbX'\]g'f]WU`
W'cb'fYI hg'cZc'f[Ub]gU'h]cbU`UbX'h'Yc'fY'h]WU`Z'Ua Yk cf_g'k]h]b'k \]W'Ybj]fcb a YbHU`]ggi Yg'U'fY'j'bh'fd'fY'hX
UbX'XYW]g]cb'a U_]b['c'VW'fg" M'ci 'k]`]bj Ygh[U'h'Y'fc'Y'cZ'g'W'Y'b'W'UbX'h'Y'j'bz'i YbW'c'Z'h'W'bc`c[]WU`
W'Ub[Y'cb'V'ch'Ybj]fcb a YbHU`]a dU'W'g'UbX'Ybj]fcb a YbHU`a UbU[Ya Ybh'H\Y'W'ci fgY'i gY'g'W'U'g'Y'gh X]Y'g
cZ]a dcfU'bh'Ybj]fcb a YbHU`]ggi Yg'hc'YI d'cf'Y'gcWU`g'W'Y'b'W'a Y'h'c'X'g'UbX'd'f'c]]X'Y'Ub'c]j Y'fj]Yk 'cZ'h'Y
W'cb'f]Vi h]cb'g'a UXY'V'm'U'f'Ub[Y'c'Z'X]g'W'd`]b'U'f'm'U'f'Y'U'g"

5h\hY'W'cb'Wi g]cb'cZ'h]g'W'ci fgY'h'Y'gh'XYbh'k]`VY'UV'Y'hc

%' YI d'U]b'hY'gcWU`W'cb'g'f'i W]cb'c'Z'Y'bj]fcb a YbHU`]X'Y'U'g'UbX'Y'bj]fcb a YbHU`a UbU[Ya Ybh'd'f'U'W'W'g
&"]X'Y'bh]z'm'UbX'X]g'W'gg'_Y'm'YI'U'a d'Y'g'c'Z'g'c'W'U`g'W'Y'b'W'a Y'h'c'X'c`c[mii gYX'j'b'Ybj]fcb a YbHU`
a UbU[Ya Ybh
' " d'f'c]]X'Y'U'W'h]WU`Ub'U'm]g]c'Z'Y'bj]fcb a YbHU`a U'h'f'g'z'Y'bj]fcb a YbHU`d'c`]W'm'UbX'Y'bj]fcb a YbHU`
a UbU[Ya Ybh'z'i g]b['gc'W'U`g'W'Y'b'W'Z'Ua Yk cf_g
(" Y'j'U'i U'h'Y'fc'Y'c'Z'g'W'Y'b'W'UbX'h'Y'j'bz'i YbW'c'Z'h'W'bc`c[]WU`W'Ub[Y'cb'Y'bj]fcb a YbHU`]a dU'W'g
UbX'a UbU[Ya Ybh
) " U'g'g'Y'g'h'Y'fc'Y'c'Z'h'Y'gcWU`g'W'Y'b'W'g'j'b'Ybj]fcb a YbHU`a UbU[Ya Ybh'UbX'd'c`]W'h
*" W'h]WU`m'X'Y'V'U'h'X'Y'W]g]cb'g'a UXY'UV'ci h'Y'bj]fcb a YbHU`a UbU[Ya Ybh

HYUW]b['G'h'f'U'h'Y[]Y'g'

H\Y'W'ci fgY'j'g'V'U'g'Y'X'cb'h'Y'V'Y'j'Z'h'U'h'U'[cc'X'Y'bj]fcb a YbHU`a UbU[Y'f'b'Y'Y'X'g'hc'i b'X'Y'f'g'h'U'b'X'h'Y'V'f'c'U'X'Y'f
W'cb'f'YI h'z'c'f'Y'bj]fcb a YbHU`]ggi Yg'UbX'f'Y'ei]fY'g'j'bh'f'X]g'W'd`]b'U'f'm'UbX'gc'W'U`g'W'Y'b'W'g_]`g'UbX'W'h]WU`
h]b_]b["'H\Y'W'ci fgY'j'g'X'Y'g]b'Y'X'hc'Y'b'W'ci fU[Y'gh'X'Y'bh'g'hc'h]b_]W'h]WU`m'z'c'f'h'Ya gY'j'Y'g'U'V'ci h
Y'bj]fcb a YbHU`d'f'c'V'Ya g" H\Y'W'U'g'g'f'c'c'a 'g'Y'g'g]cb'g'U'f'Y'\][\m]b'h'f'U'W'h]j'Y'UbX'U'g'a i W'X'U'g'd'c'g'g]V'Y'i h']g'Y
X]g'W'gg]cb'UbX'ei Y'gh]cb'g'U'g'U'_Y'm]j'Y\]W'Y'z'c'f[U]b]b['i b'X'Y'f'g'h'U'b'X]b["'@_Y'U`h'Y': i b'X'U'a YbHU`
? b'c'k'Y'X[Y'W'ci fgY'g'z'h]U]a g'hc'\Y'd'm'ci 'X'Y'j'Y'c'd'V'U'g]W'Y'bj]fcb a YbHU`]h'f'U'W'h]j'Y'UbX'U'g'a i W'X'U'g'd'c'g'g]V'Y'i h']g'Y
f'k \]Y'h'Y'A 9A 'W'c'f'Y'W'ci fgY'g'z'c'W'g'c'b'U'W'h]WU`U'd'd'f'Y'W'U'h]cb'c'Z'X]Z'Y'f'Y'bh'Z'Ua Yk cf_g'z'c'f'Y'bj]fcb a YbHU`
a UbU[Ya Ybh'UbX'h'Y'k]X'Y'W'c]W'c'Z'Y'Y'W'h]j'Y'g'Y'b'U'V'Y'g'm'ci 'hc'X'Y'g][b'h'Y'd'f'c[f'U'a 'h'U'h'V'Y'g'h'a Y'Y'g'm'ci f
b'Y'Y'X'g" 5b]a dcfU'bh'U'g'd'Y'W'c'Z'h'Y': i b'X'U'a YbHU`? b'c'k'Y'X[Y'W'ci fgY'g'j'g'h'U'h'Y'U'W'k]`U`c'k'm'ci 'hc
W'h]WU`m'f'Y'Z'Y'W'c'b'h'Y'W'cb'f]Vi h]cb'c'Z'U'd'U'f'h]W'U'f'X]g'W'd`]b'U'f'm'U'f'Y'U'g'!]b'h]g'W'U'g'Y'h'Y'G'c'W'U`G'W'Y'b'W'g"

5ggYgga Ybh

: i ~[i]XUbW']g'Uj U]UVY'j]U'hY'Wci fgY'A ccX'Y'g]hY"

5ggYgga YbhHUg_g`

5ggYgga YbhHUg_	K Y][\ h	8i Y'8UH	Gh XYbh@YUfb]b[Ci hWta Yg'5ggYggYX
K YY_`mfYUX]b[Ugg][ba Ybthg`	' \$i	7 ca d`YH`VmiK YY_`%%	%z&ž
9ggUm	' \$i	Xi Y'a]X'gYgg]cb/]I UWhXUH hc`VY`UXj]gYX"	%ž ž(ž) ž*
Gh XYbhDfYgYbth]cb`	%%\$i	DfYgYbh]b`WUgg`cf`cb!]`bY`]b mci f`XYg][bUH`X`k YY_`	%z&
7 UgY`Gh Xm	' \$i	Gi Va]hVmYbX`cZhY`Wci fgY" 9I UWhXUH`hc`VY`UXj]gYX"	&ž ž(ž)

5ggYgga Ybh8YHJ]`g

5ggYgga Ybh%`K YY_`mfYUX]b[`Ugg][ba Ybthg`

GHUfhXUH. `7 ca a YbW']b`K YY_`&

8YHJ]`g. `5bU`mg]g`k]h`g`cfhgi a a Uf]Yg`fl \$\$\$`k cfXg`dYf`k YY_`žZcf`%\$`k YY_g`cZk YY_`mgYhfYUX]b["
`bX]]Xi U`ZYXVUW`"

5XX]h]cbU`XYHJ]`g.

: i fhYf`[i]XUbW`k]`VY`dfcj]XYX`j]U`mci f`Wci fgY`A ccX`Y`g]hY"

Gi Va]gg]cb`bchYg.Gi Va]hj]U`A ccX`Y

Hi fb]h]b`gYH]b[. `H\]g`]g`bchU`Hi fb]h]b`Ugg][ba Ybh

5ggYgga Ybh&. `9ggUm

GHUfhXUH. `

8YHJ]`g. `5`dfY`ja]bUfmYggUm]g`[] Yb`hc`hY`gh XYbhg`Zca `U`fUb[`Y`cZgcW]U`gW]YbW`hcd]Wg`Ug`fY`Uh]b[`hc
Ybj]fcb a Ybth`a UbU[Ya Ybh`#bj]fcb a Ybth`]ggi Yg`"5ddfcI`%) \$\$\$`k cfXg`"K`f]hYb`ZYXVUW`

5XX]h]cbU`XYHJ]`g.

: i fhYf`[i]XUbW`k]`VY`dfcj]XYX`j]U`mci f`Wci fgY`A ccX`Y`g]hY"

Gi Va]gg]cb`bchYg.Gi Va]hj]U`A ccX`Y

Hi fb]h]b`gYH]b[. `H\]g`Ugg][ba Ybh]g`gi Va]hY`X`h`fci [\ `Hi fb]h]b`UbX`gh XYbhg`Xc`bchgYY`Hi fb]h]b

g]a]Uf]mfYdcfrg"

5ggYgga Ybh' . 'Ghi XYbhDfYgYbhUhgcb

GHUfhXUHY. '7 \ccgY' hcd]WYUf'm]b' h\Y' Wci fgY

8YHU]`g. 'Ghi XYbhdfYgYbhUhgcb'cb'k YY_'mfYUX]b[g'UbX'U'fY'UH'X'Ybj]fcb'a YbhU'YI Ua d'Y'"5ddfcI]a UHY'm %\$!%) 'a]bi h'rg": YYXVUW_']g'dfcj]XYX'j YfVU'mUZh'f'dfYgYbhUhgcb'UbX'h\Yb'U'k f]h'Yb'a Uf_'g\YYh

5XX]hgcbU'XYHU]`g.

: i f\Yf' [i]XUbW'k]'VY'dfcj]XYX'j]U'mci f'Wci fgY 'A ccX'Y'g]h'"

Gi Va]gg]cb' bch'g.C b!WJa di g'ghi XYbh'g'dfYgYbh]b'WUgg"8]g]U'UbW'ghi XYbh'g'gi Va]hj]U'A ccX'Y'Z'fi a "

Hi fb]hg]b'gYH]b[. 'H\]g]g'bchU'Hi fb]hg]b'Ugg][ba Ybh

5ggYgga Ybh(. '7 UgY'Ghi Xm

GHUfhXUHY. '7 ca a YbW'k cf_'YUf'm]b' h\Y'gYgg]cb

8YHU]`g. 'X]j]Xi U'fYgYUfW'YUX]b['h' U'fYdcfhf% '\$\$'k cfXgE' 'X]j]Xi U'k f]h'Yb'ZYXVUW_'H\]g]g'h\Y'Z]bU' UggYgga YbhZ'f'UH'YbXUbW' di fdcgYg"

5XX]hgcbU'XYHU]`g.

: i f\Yf' [i]XUbW'k]'VY'dfcj]XYX'j]U'mci f'Wci fgY 'A ccX'Y'g]h'"

Gi Va]gg]cb' bch'g.Gi Va]hj]U'A ccX'Y

Hi fb]hg]b'gYH]b[. 'H\]g]Ugg][ba Ybh]g'gi Va]h'X'h'fci [\ 'Hi fb]hg]b'UbX'ghi XYbh'Xc' bchgYY'Hi fb]hg]b g]a]Uf]mfYdcfrg"

Gi Va]gg]cb`cZ5ggYgga YbhHUg_g

- K cf_`gi Va]hYX`%\$`hc`%-`XUmg`UZhYf`h\Y`gh]di``UhYX`XYUX`]bY

5 WUXYa]W<c bYghmUbX`D`U[]Uf]ga

D`U[]Uf]ga `]g`i g]b[`hY`k cfXg`cf]XYUg`cZchYfg`UbX`dfYgYb]b[`hYa `Ug`mci f`ck b" #WUb`hU`Y`a Ubm
Zfa gZ`Zca `XY`]VYfUHY`WXYU]b[`hc`UWV]XYbU`mW`cdm]b[`Zca `U`gci fW`k]hCi hUW_bck`YX[Ya Yb]f`

I BGK `[fci dg`d`U[]Uf]ga `]bhc`hY`Zc`ck]b[`WUHY[cf]Yg.

7cdm]b[.`i g]b[`hY`gUa Y`cf`j Yfmg]a]Uf`k cfXg`hc`hY`cf][]bU`hYI hcf]XYU`k]hCi hUW_bck`YX[]b[`hY
gci fW`cf`i g]b[`ei ch]hcb`a Uf_g`"H\]g`U`gc`Udd`]Yg`hc`]a U[YgZ`UfhUbX`XYg][b`dfc`YWgZ`Ug`k Y`Ug
dfYgYb]h]cbg`k \YfY`gca YcbY`dfYgYb]h]cbg`k]hCi hWVYX]f`

#Uddfcdf]UHY`dUfUd`fUg]b[.`7`U`b[]b[`U`ZYk`k cfXg`UbX`d`fUgYg`k`Y`a cghm]fYU]b]b[`hY`cf][]bU`
ghfi`W`fY`UbX`#`f`dfc[fYgg]cb`cZ]XYUg`cZ`hY`cf][]bU`Z`UbX`]bZ`fa U]cb`k]hCi hUW_bck`YX[Ya Yb]f`H\]g`U`gc
Udd`]g]b`d]YgYb]h]cbg`k`e`d`Y`f`g`ca YcbY`dUfUd`fUgYg`Ubcb`Y`f`g]XYUg`c`f`k`c`X`k]hCi hWVYX]h`UbX`h`c`f`gh`c
d]YW]b[`hc[Y`h`Y`f`ei`ch`Y`g`UbX`d`UfUd`fUgYg`]bhc`U`bYk`k`c`Y`Z`k]hCi hUddfcdf]UHY`fY`ZY`f`b`W]b["

7cUgG]cb`k cfX`b[]h]h`cchYfg`U`hU`gY]b[`eZ`hY`ccfX`Ug`k`U`fg`b`g]X`]h`XY`h`cfX`7`UgG`

- i bXYfghUbx'mci f'f][\hg'UbX'fYgdcbg]V]]hYg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[]Uf]ga ž'Wcdmf][\hžI BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5Ww'dhUV'Y'I gY'cZ I BGK '⇒H'F Ygci fW'g'Dc`]Ww
- VY'Uk UfY'cZh'Y'ghUbxUfXg'cZVY\Uj]ci f'YI dYW'X'cZYj Yfmcby']b'h'Y'I BGK 'Wca a i b]m
- `cWJh'gYfj]Wg'UbX']bZcfa Uh'cb'UVci hl BGK 'UbX'I BGK '@VfUfm

Gca Y'cZh'YgY'UfYUg'k]`VY'ZJa]]Uf'hc'mci ž'ch'Yfg'k]`VY'byk "; U]b]b['U'gc`X'i bXYfghUbx]b['cZU`h'Y fY'UH'X'UgdYW'g'cZ9@G9'k]`Y'd'mci 'a U_Y'h'Y'a cghcZmci f'gh X]Yg'Uhl BGK "

[f\hd.#gi.VYWfi.jYg"jVfUfmi.bgk"YXi."Ui.#'jgY#UVci.h'jgYt](#)

7 ci fgY'GWXYXi `Y

[J.Jyk`WUgg`ha`YhUV`Y](#)

H]a`YhUV`Y`

8UhY	HmdY	7cbhYbh
K`YY_`%`&`>`i`m!`&-`>i`m	6`YbXYX	h]fcXi`W]cb.`h`Y`g`W`d`Y`c`Z`h`Y`U`f`r`g`z`>`i`a`Ub]h]Yg`UbX`gc`W]U`g`W]Yb`W`g`/`UbX`h`Y`f`f`Y`U`h]c`b`g`\`d`k`]h`Y`b]`]f`c`b`a`Y`b`h`U`a`UbU[`Ya`Y`b`h`
K`YY_`&`.`>`\$`>i`m!)` 5i`[i`gh	6`YbXYX	A`c`Xi`>`Y`%`<`]g`h`c`f`m`z`>`i`a`Ub`[`Y`c`[`f`U`d`\`m`z`UbX`h`Y`Y`b]`]f`c`b`a`Y`b`h`
K`YY_`"`.`*`5i`[i`gh!`%&` 5i`[i`gh	6`YbXYX	A`c`Xi`>`Y`%`W`c`b`h]`b`i`Y`X.`>`\`]g`h`c`f`m`z`>`i`a`Ub`[`Y`c`[`f`U`d`\`m`z`UbX`h`Y`Y`b]`]f`c`b`a`Y`b`h`
K`YY_`(`.`%`5i`[i`gh!`%`-` 5i`[i`gh	6`YbXYX	A`c`Xi`>`Y`&`.`9`b]`]f`c`b`a`Y`b`h`U`Y`h`]W`g`UbX`d`\`]c`g`c`d`\`m`
K`YY_`(`.`&\$`5i`[i`gh!`&`*` 5i`[i`gh	6`YbXYX	A`c`Xi`>`Y`&`.`W`c`b`h]`b`i`Y`X.`9`b]`]f`c`b`a`Y`b`h`U`Y`h`]W`g`UbX`d`\`]c`g`c`d`\`m`
K`YY_`*`.`&+`5i`[i`gh!`&` GYd`h`a`V`Y`f`	6`YbXYX	A`c`Xi`>`Y`"`.`7`i`h`f`U`U`d`d`f`c`U`W`X`Y`g`h`c`Y`b]`]f`c`b`a`Y`b`h`U`b`X`Y`b]`]f`c`b`a`Y`b`h`U`]g`a`.`h`Y`j`]Y`k`Z`f`c`a`U`b`h`f`c`d`c`c`[`m`i`U`b`X`g`c`W]c`c`[`m`
K`YY_`+`.`>`GYd`h`a`V`Y`f`!`-` GYd`h`a`V`Y`f`	6`YbXYX	A`c`Xi`>`Y`"`.`W`c`b`h]`b`i`Y`X.`7`i`h`f`U`U`d`d`f`c`U`W`X`Y`g`h`c`Y`b]`]f`c`b`a`Y`b`h`U`b`X`Y`b]`]f`c`b`a`Y`b`h`U`]g`a`.`h`Y`j`]Y`k`Z`f`c`a`U`b`h`f`c`d`c`c`[`m`i`U`b`X`g`c`W]c`c`[`m`
K`YY_`,`.`%`\$`GYd`h`a`V`Y`f`!` %`*`GYd`h`a`V`Y`f`	6`YbXYX	A`c`Xi`>`Y`(`.`9`b]`]f`c`b`a`Y`b`h`U`W`c`b`f`c`j`Y`f`g`m`U`b`X`_`b`c`k`Y`X`[`Y`W`c`b`g`h`f`i`W]c`b.`h`Y`Z]Y`X`c`Z`g`W]Y`b`W`U`b`X`h`Y`W`b`c`c`[`m`i`g`h`X]Y`g`
K`YY_`-`.`%`+`GYd`h`a`V`Y`f`!` &`GYd`h`a`V`Y`f`	6`YbXYX	A`c`Xi`>`Y`(`.`W`c`b`h]`b`i`Y`X.`9`b]`]f`c`b`a`Y`b`h`U`W`c`b`f`c`j`Y`f`g`m`U`b`X`_`b`c`k`Y`X`[`Y`W`c`b`g`h`f`i`W]c`b.`h`Y`Z]Y`X`c`Z`g`W]Y`b`W`U`b`X`h`Y`W`b`c`c`[`m`i`g`h`X]Y`g`
6`f`Y`U`_`&`(`>`GYd`h`a`V`Y`f`!`)`>`\$`GYd`h`a`V`Y`f`	F`Y`U`X`]b`[`	h]X`Y`d`Y`b`X`Y`b`h`f`Y`g`Y`U`f`W`X`"`.`b`c`W`U`g`g`
K`YY_`%`\$`.`%`C`W`c`V`Y`f`!`+` C`W`c`V`Y`f`	6`YbXYX	A`c`Xi`>`Y`(`.`G`c`W]U`g`W]Y`b`W`z`d`c`]W`h`i`U`b`X`d`c`]h]W`g`/`Ub`X`d`U`f`h]W]d`U`h`c`f`m`U`d`d`f`c`U`W`X`Y`g`
K`YY_`%`%`,`>`C`W`c`V`Y`f`!`%`(` C`W`c`V`Y`f`	6`YbXYX	A`c`Xi`>`Y`(`.`W`c`b`h]`b`i`Y`X.`G`c`W]U`g`W]Y`b`W`z`d`c`]W`h`i`U`b`X`d`c`]h]W`g`/`Ub`X`d`U`f`h]W]d`U`h`c`f`m`U`d`d`f`c`U`W`X`Y`g`
K`YY_`%`&`.`%`(`>`C`W`c`V`Y`f`!` &%`C`W`c`V`Y`f`	6`YbXYX	A`c`Xi`>`Y`(`.`W`c`b`h]`b`i`Y`X.`G`c`W]U`g`W]Y`b`W`z`d`c`]W`h`i`U`b`X`d`c`]h]W`g`/`Ub`X`d`U`f`h]W]d`U`h`c`f`m`U`d`d`f`c`U`W`X`Y`g`/`k`]h`W`c`b`W`i`g]c`b`h`c`h`Y`W`c`i`f`g`Y`
K`YY_`%`"`.`&&`C`W`c`V`Y`f`!` &`,`C`W`c`V`Y`f`	<`c`a`Y`k`c`f`_`	:`]b`U`f`Y`g`Y`U`f`W`X`U`b`X`k`f`]h]b`[`"`.`B`c`W`U`g`g`

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

5``]bZcfa Uhcb`cb`fYgci fWg`]g`Uj U]UV`Y`j]U`hY`Wci fgY`A ccX`Y`g]h`"

F YWca a YbXYX`F Ygci fWg

5``]bZcfa Uhcb`cb`fYgci fWg`]g`Uj U]UV`Y`j]U`hY`Wci fgY`A ccX`Y`g]h`"

7ci fgY`9j U`i Uh]cb`UbX`8Yj Y`cda Ybh

A m9l dYf]YbW`k]``VY`i gYX`Zc`f`Yj U`i Uh]cb`Uh`hY`YbX`cZ`hY`Wci fgY`"

5`a]X]gYgg]cb`Zc`W`g`[fci d`X]gW`gg]cb`k]``dfcj]XY`Yj U`i Uh]cb`cZdfc[fYgg"

⇒ U[Y`7fYX]h

7ca a i b]m9b[U[Ya Ybh`<ck`WUb`gcW]U`gW]YbW`\Y`d`UggYgg`h`Y`]a dUW]g`cZi fVUb`XYj Y`cda YbhB
6UfUb[Ufcc`GnXbYm`D`l`c`c`[fUd`V`mDUi ``6fck`b`"

7F ⇒ CG

7F ⇒ CG`Dfcj]XYf`7cXY.`\$\$\$`-``,`;