

5 Wh]cb 'di f']b '? fcUh]Yb. 'Ghi bh!: Ygh]j U` VY[Y]ghYfh'a]h'9l d`cg]cbYb°

Ghi bhZYgh]j U``]b'?fcUh]Yb'k ØfX][h'Ghi bh`Yi hY"'5V'&\$&, '[]Vh Yg'Y]bYb'CgWUf'ZØf'Ghi bh!8Yg][b"'G]W\Yf\Y]h'i bX'?fYUh]j]hÀh]a ': c_i g"



? Uf`cj UWz'? fcUh]Yb'!!=b'XYf'?`Y]bghUXh'?Uf`cj UWz'fi bX') \$
?]`ca YhYf'gØXk Ygh`]WX'j cb'NU[fYVz'Z]bXYh'XYfnY]h'Y]b': Ygh]j U`
ghUhhz'XUg'X]Y'VYY]bXfi W_YbXYb'@Y]ghi b[Yb'j cb'Ghi bh`Yi hYb']b
XYf':]`a VfUbWXY'k ØfX][h''I bhYf'XYa 'A chhc' 8 fY]' 'nk Y]' 'Y]bg'
5\Wh]cb'' 'k]fX']a '9X]gcb!?]bc'Y]b'Vi bhYg'Dfc[fUa a '[YVchYbz'XUg
gck c\``k U[\U`g][Y'Ghi bhg'Ui Z'XYf'GhfU» Y'U`g'Ui WX'\]ghcf]g\WXY
GnYbYb'Ui g'XYa 'A]hhY`U`hYf'i a ZUggh"'\decorate{1} Ub'; c'a YfU\z'8]fY_hcf
XYg'?]bcgz'Yf'Ài hYfh'XYb'K i bg\Wz'?Uf`cj UWZ\OfY]b'K c\WXYbYbXY
ni f'6fcbI 'ni 'a U\XYb'i bX'gc'X]Y'@Y]XYbg\WXUZh'Z\Of
UXfYbU`]b[Y`UXYbY'5\Wh]cb'ni 'j Yfa]hhY`b''8Yf': Ygh]j U`ghUfh'Z]Y``Ui Z
Y]bYb': fY]hU['i bX'VYY]bXfi \W_hY'X]Y'Ni g\WXUi Yf'a]h'gdY_hU_i `AfYb
J YfZc`[i b[g'U[XYbz'YI d`cg]j Yb'9ZZY_hYb'i bX'Y]bXfi \W_gj c``Yb
G\WX]Y*YfY]Yb"

8 Ug': Ygh]j U``\Uh']b`X]YgYa `&U\f'Y]bY`VYgcbXYfY`6YXYi hi b[ž'XU`Yg X]Y`Bchk YbX][_Y]h'i bhYfghfY]W\hž'X]Y`Fc``Y`XYf'Ghi bha ÀbbYf'i bX !ZfUi Yb`]b`XYf':]`a dfcXi _h]cb`ni `VY`Yi W\hYb"'8]Yg'[YgW\]Y\h Ui W\']a `?cbhYI h'Y]bYf'VYXYi hYbXYb`BYi Yfi b[ž'X]Y`X]Y :]`a U_UXYa]Y`]b`<c``mk ccX`Ub[Y_ØbX][h'\Uh`5V`&\$&, `k]fX`Y]bY Y][YbY`CgWUf!?UhY[cf]Y`ZØf`XUg`VYghY`Ghi bh!8Yg][b`Y]b[YZØ\fh" 8]YgY`9bhgW\Y]Xi b[`]gh`XUg`FYgi `hUh''U\fY`Ub[Yf`6Ya Ø\i b[Yb j cb`Ghi bh!DYfZcfa Yfb`i bX`6fUbW\YbdfcZ]gž'X]Y`YbX`]W\`Y]bY Ub[Ya YggYbY`5bYf_Ybbi b[`]\fYf`5fVY]h`ZcfXYfhYb"`8]Y`?UhY[cf]Y gc```cZZ]n]Y``` 5W\]Yj Ya Ybh']b`Ghi bh'8Yg][b`\Y]»Yb`i bX`k]fX`X]Y ; YgUa hnU\``XYf`CgWUf!?UhY[cf]Yb`Ui Z`&(`Yf\`O\Yb"

$8]Y 9]bZ\emptyset \ fib[XYfCgWUf!?UhY[cf]Y$

 $8]Y \cdot 5 \text{WUXYa} \quad \text{mcZA} \quad \text{ch]cb'D]Whi} \quad \text{fY'5fhg'UbX'GW]YbWYg'\Uh} \\ = \text{`Uf[YghY``hž'XUgg'X]Y'} \Rightarrow \text{hY[fUh]cb'XYg'Ghi} \quad \text{bh!} \\ 8 \text{Yg][bg']b'X]Y'CgWUf!} \\ 5 \text{i} \quad \text{gnY]W} \quad \text{bi} \quad \text{b[Yb']} \quad \text{cb'[fc} \quad \text{Yf'6YXYi} \quad \text{hi} \quad \text{b[']gh''8Uj]X'@Y]hW} \quad \text{Z'XYf} \\ Y \setminus \text{Ya} \quad \text{U'][Y'Ghi} \quad \text{bha} \quad \text{Ub'i} \quad \text{bX'FY[]ggYi} \quad \text{fž'gd]Y'hY]bY'nYbhfU'Y'Fc``Y'V]'X]YgYf'* \Rightarrow \text{]h]Uh]j} \quad \text{Y'''9f'} \quad \text{Uh'g]W} \quad \text{XUZØf'Y]b[YgYhnhž'XUgg'X]Y'YbhgWXY]XYbXY'Fc``Y'j \quad \text{cb'Ghi} \quad \text{bh!} \\ 8 \text{Yg][bYfb'i} \quad \text{bX'XYfYb'} = \text{fYUh]j} \quad \text{Yb} \\ \text{i} \quad \text{bX'g]WXYf} Y] \quad \text{UbhYb'6Y]hfA[Yb']a':]`a Ya UWXYb'UbYf_Ubbhkk]fX'''Fi bX''%$ Ghi bh!DfcZ]gž'A]h[`]YXYf'XYf':]`a U_UXYa]YžkYfXYb'Ub'XYf'9bhk]W_`i b['XYf'cZZ]n]Y``Yb'FY[Y'b'ZØf'X]YgY'bYi Y'?UhY[cf]Y'a]hk]f_Yb''$

8]Y'Ghi bh!7ca a i b]hm'nY][h'g]W\'cdh]a]gh]gW\'ØVYf'X]YgY
BYi Yfi b["8Uj]X'GhYf']b[ž'Y]b'YfZU\fYbYf'Ghi bh!?ccfX]bUhcfž\Uh
g]W\'dcg]h]j 'ni 'XYf'9]bZØ\fi b['Ui g[YgdfcW\Yb'i bX'\YVh'\Yfj cfž
XUgg'Yg'Ub'XYf'NY]h'gY]ž'X]Y'JYfX]YbghY'XYf'Ghi bh`Yi hY'[YVØ\fYbX
ni 'k ØfX][Yb"'; 'Y]W\nY]h]['k Ufbh'Yfž'XUgg'5gdY_hY'k]Y'G]W\Yf\Y]h
i bX'X]Y'\DhY[fUh]cb'j cb'Ghi bhg']b'X]Y'9fnÀ\`i b['VY]'XYf
6Yk Yfhi b['VYfØW_g]W\h][h'k YfXYb'gc``hYb"

9]b 6`]W_ Ui Z X]Y Ni _i b Zh XYf Ghi b hg

8 Ug'? Uf`cj UW: Ygh]j U``i bX'X]Y'bYi [Yd`UbhY'CgWUf!? UhY[cf]Y nY][Ybž'XUgg'X]Y'6YXYi hi b['j cb'Ghi bhg'i bX'XYb'XUa]h j YfVi bXYbYb'< YfUi gZcfXYfi b[Yb']a':]`a Ya UWXYb'ni bY\a YbX]a :: c_i g'ghY\h":8]Y'U_hi Y``Yb'CgWUfg'k YfXYb'VYfY]hg']b'&'
? UhY[cf]Yb'j Yf[YVYbž'UVYf'X]Y'9]bZØ\fi b['Y]bYf'?UhY[cf]Y'ZØf
Ghi bh!8Yg][b'i bX'X]Y'DfÀa]Yfi b['ZØf' 6Ygh'7Ugh]b[']a
_ca a YbXYb'\\\f'j YfXYi h`]W\Yb'XUg'k UW\\gYbXY'\\\hYfYggY'Ub'XYb
j YfgW\]YXYbYb'5gdY_hYb'XYf':]`a dfcXi_h]cb"

8 Yf'Ghi bh!DfY]g'k]fX'Yfgha U`g'VY]'XYf'%\$\$"'5 WUXYa m'5k UfXg NYfYa cb]Y']a '\\\f'&\\$\, 'j Yf`]Y\Yb'i bX'ghY``h'XUa]h'Y]bYb A Y]`YbghY]b']b'XYf'; YgW\]W\hY'XYf'C gWUf!J Yf`Y]\i b[Yb'XUf"?f]h]_Yf'VYZØfW\hYb'nk Ufž'XUgg'Xi fW\'X]Y'<]bni ZØ[i b['bYi Yf?UhY[cf]Yb'XYf'DfYgh][Y'XYf'VYghY\YbXYb'5i gnY]W\bi b[YbVYY]bhfÀW\h][h'k YfXYb'_ObbhYž'XcW\'X]Y'Ghi bh!7ca a i b]hm'g]Y\hXUf]b'Y]bY'hfUbgZcfa Uh]j Y'A O[`]W_Y]hž'Y]bY'cZh'ØVYfgY\YbY?i bghZcfa 'ni 'k ØfX][Yb"

8 Y hU]`g	
J c f ZU``	Gcbgh][Yg
Cfh	?Uf`cj UWŽ?fcUh]Yb
EiY``Yb	• Vbb"XY
	• k k k "UfW\ mXY"Wca
	k k k "XYi hgWX`UbXZi bi`hi f"XY

6Ygi WXYb G]Y i bg Ui Z b!U["XY