

7fmghU`7UgWUXYgž7U]fbg.'Jc``ghÀbX][YfGW\k]aa`cW\!'ibX`K UggYfZU``ZØ\fYf

8]Y'7fmghU`'7UgWUXYg'g]bX'j]Y``Y]WXh'Y]bYg'XYf
VYfØ\a hYghYb'GWXk]a a `OWXYf']b'XYf'BÀ\Y'j cb'7U]fbg"'9g
j YfZØ[h'ØVYf'a Y\fYfY'GhY``Yb'Ybh`Ub['XYg'6UWXYg'ni a
GW.k]a a Yb'gck]Y'Y]bYb'gWX\ObYb'K UggYfZU``'Ua '9bXY"
9bhXYW_Yb'G]Y'X]YgYb'j c``ghAbX][Yb'@Y]hZUXYb'ZØf'XYb
6Ygi WX'XYf'7fmghU`'7UgWUXYg']b'7U]fbgz'5i ghfU']Yb"'8]Y
7fmghU`'7UgWUXYg'g]bX'Y]bY'FY]\Y'j cb'GØ*k UggYfZA``Ybz'X]Y
bi f'Y]bY'_i fnY'&)!a]bØh][Y': U\fh'j cb'7U]fbg'YbhZYfbh
`]Y[Yb"'9g'[]Vh'a Y\fYfY'YfZf]gWXYbXY'GWXk]a a `OWXYfz'X]Y
Y]bY'i b[`Ui V`]WXY'A O[`]WX_Y]h'V]YhYbz'g]WX']a '\Y]*Yb
hfcd]gWXYb'BcfX!Ei YYbg`UbX!?`]a U'UVni _Ø\`Yb"'8]Yg']gh'Y]b
j c``ghAbX][Yf'@Y]hZUXYb'ZØf'XYb'6Ygi WX'XYf'VYfØ\a hYb
7UgWUXYg'j cb'7U]fbg"'\=\WX'\UVY'\=\bZcfa Uh]cbYb'XUfØVYfz'k]Y
G]Y'\]Yf\Yf'_ca a Ybz'k Ug'/ Ua d\Y``]d/

8]Y'7fmghU`'7UgWUXYg'g]bX'j]Y``Y]W\h'Y]bYg'XYf'VYfØ\a hYghYbGW\k]a a `ÒW\Yf']b'XYf'BÀ\Y'j cb'7U]fbg"'9g'j YfZØ[h'ØVYf'a Y\fYfYGhY``Yb'Ybh`Ub['XYg'6UW\Yg'ni a 'GW\k]a a Yb'gck]Y'Y]bYbgW\ÒbYb'K UggYfZU``'Ua '9bXY"'9bhXYW_Yb'G]Y'X]YgYbjc``ghÀbX][Yb'@Y]hZUXYb'ZØf'XYb'6Ygi W\'XYf'7fmghU`'7UgWUXYg']b7U]fbgž'5i ghfU`]Yb"'

8]Y '7 fmghU` '7 UgWUXYg 'g]bX 'Y]bY 'FY]\Y 'j cb 'GØ» k UggYfZÀ``Ybž X]Y bi f'Y]bY '_i fnY '&) !a]bØh][Y : U\fh'j cb '7 U]fbg 'YbhZYfbh'`]Y[Yb" '9g []Vh'a Y\fYfY 'YfZf]gW\YbXY 'GW\k]a a `ÒW\Yfž 'X]Y 'Y]bY i b[`Ui V`]W\Y 'A Ò[`]W_Y]h'V]YhYbž 'g]W\ ']a '\Y]» Yb 'hfcd]gW\Yb 'BcfX! Ei YYbq`UbX!? `]a U'UVni _Ø\`Yb"

8]Ygʻ]ghʻY]bʻj c``ghÀbX][Yfʻ@Y]hZUXYbʻZØfʻXYbʻ6Ygi W\`XYf VYfØ\a hYbʻ7UgWUXYgʻj cbʻ7U]fbg"ʻ\W`\UVYʻ\\Zcfa Uh]cbYb XUfØVYfž'k]YʻG]Y`\]Yf\Yfʻ_ca a Ybž'k UgʻG]YʻYfk UfhYhžʻgck]YʻY]b][Y

$K c g]b X X]Y ? f]ghU``_Ug_UXYb3`$

H\Y`7fmghU``7UgWUXYg`]gh`Y]b``c_U`Yf`BUaY`ZØf`X]Y`j]Y`YbGWkk]aa`ÒWkYf`ibX`KUggYfZÀ``Y`Ybh`Ub[`XYg`:fYg\kUhYf7fYY_"`8]YgYf`6UWk`Z]Y»h`XUg`[UbnY`*J\f`ØVYfž`XU`Yf`jca`@U_YAcff]g`ibX`XYb`j]Y`Yb`BYVYbZØggYb`XYf`@UaV`FUb[Y`[YgdY]ghk]fX"

8]Y?Ug_UXYb;jYfZØ[Yb'ØVYf'Y]bYb'Y][YbYb'DUf_d`Uhnž'XYf'g]WX Yhk U'%, ž+'?]`ca YhYf'j cb'7U]fbg'768'YbhZYfbh'VYZ]bXYh"

; $cc[`Y`AUdg`D]b.`?f]ghU``_Ug_UXYb$

K]Y a Ub j cb 7U]fbg \]Yf\ Yf \ _ca a h

 $C\ Vk\ c\ ``X]Y\ '7\ fmghU``7\ UgWUXYg`Y]b\ 'gY\ f`VY`]YV\ hYf`C\ fh'ZØf \\ 9]b\ Y]a\]gWk\ Y\ 'g]b\ X\check{z}'[\]Vh'Yg`\]Yf'_Y]b\ Y\ 'ÒZZYb\ h`]Wk\ Yb\ 'J\ Yf_Y\ fga\]hhY`"$

I a 'bUW\'7fmghU`'7UgWUXYg'ni '[Y`Ub[Ybž'VYbÒh][Yb'G]Y'U`gc'Y]b 5i hc"'K Ybb'G]Y'Ui g'XYf'GhUXh'7U]fbg'_ca a Ybž'g]bX'Yg'bi f'&) A]bi hYb': U\fh'\]bhYf'FYX`mbW\'V]g'ni 'XYb'5i »YbVYn]f_Yb'XYg 6Uffcb': U``g'BUh]cbU``DUf_"

 $\begin{tabular}{ll} $= W. \begin{tabular}{ll} $= W. \begin{tabular}$

 $G]Y \stackrel{\cdot}{\to} f^{\cdot}5i \ hc ^{\cdot}UVghY ^{\cdot}Yb ^{\cdot}a \ \varnothing ggYb \check{z}^{\cdot}VYj \ cf^{\cdot}G]Y ^{\cdot}XYb ^{\cdot}7 fmghU ^{\cdot}7 UgWUXYg$ $HfU]^{\cdot}[\ Y \setminus Yb"$

K Ybb'G]Y'_Y]b'Y][YbYg'5i hc'\UVYbž'XUbb'Vi W\Yb'G]Y'Ua 'VYghYb Y]bZUW\Y]bY'7Ubmcb]b[!Hci f'UV'7U]fbg"'8]Yg']gh'Y]bYg'XYf'VYghYb 7Ubmcb]b[!9f`YVb]ggY']a '\c\Yb'BcfXYb'j cb'Ei YYbg`UbX'i bX ZØ\fh'XYb' 7fmghU`'7Ubmcb '\]bUi Z"

 $Df\emptyset ZYb G]Y XYb VYghYb DfY]g. 7U]fbg 7UbmcbYYf]b[5Xj Ybhi fY]$

 $J9F6 \pm 81B$; . GhcbYm7fYY_1: U``g

K UbXYfb Ui Z'XYa '7fmghU`'7UgWUXYg'HfUW_

8 Yf 7 fmghU` 7 UgWUXYg K U`_']gh'_Y]bYgk Y[g'Y]b 'K UbXYfk Y["FYU`]gh]gW '[YgY\Yb']gh'Yg 'Y\Yf'Y]b'_i fnYf 'GdUn]Yf[Ub['jcb'%ž&?]`ca YhYfb'Ui Z'Y]bYf'Ugd\U`h]YfhYb'GhfU» Y" 8]YgY'GhfYW_Y'VY[]bbh Ua 'cVYb'Yfk À\bhYb'DUf_d`Uhn'i bX']gh'[i h'Ui g[YgW]`XYfh'i bX`Y]W\h'ni 'Yf_YbbYb"

5 i W 'k Ybb'G]Y' \Rightarrow fY'K UbXYfgWi \Y'j]Y``Y]W h'b]W ha]hVf]b[Yb a ØggYbž']gh'Yg'XYbbcW 'Y]b'i b[`Ui V`]W 'gW ÒbYf'GdUn]Yf[Ub[Xi fW 'XYb'hfcd]gW Yb'FY[Ybk U'X'i bX'j cfVY]'Ub'gW bY``Z]Y » YbXYb'Ghfca gW bY``Yb"

9g'XUi Yfh'bi f'Yhk U'&\$'A]bi hYbž'V]g'G]Y'XUg'9bXY'XYf'K UbXYfi b[YffY]WXYbž'k c'G]Y'XYb'<Ui dhk UggYfZU```gY\Yb'_ObbYb"'9g'[]Vh YXcWX'j]Y'Y'gWXObY'6UXYghY``Yb'Zi ggUVk Àfhgž'k Ybb'G]Y'ni 'XYb K UggYfZÀ``Yb'[Y\Yb"

U`h1 7FMGH5@75G7589G`75 \pm BG'K5GG9F: \forall @9ž G7<K \pm A@C7< $^{+}$ B'89F'B $^{+}$ S9'JCB'75 \pm BG 2

J9FK5B8H9FDCGH. '8]YVYghYb'5_h]j]hÀhYb']b'7U]fbgž'5i ghfU`]Yb

8Yf?f]ghU``_Ug_UXYb!K UggYfZU```

8 Ug·9bXY·XYf·@]b]Y·ZØf·XYb·7fmghU`·7 UgWUXYg!K UbXYfk Y[']gh·XYf < Ui dhk UggYfZU``''8]YgYf·K UggYfZU```]gh·Y][Ybh`]Wk·Y]bY·FY]\Y

_`Y]bYfYf`K UggYfZÀ``Yž`X]Y`]b`Y]b`VfY]hYgž`h]YZYg`6YW_Yb`a ØbXYb" CZZ]n]Y```\Y]» h`X]YgYf`K UggYfZU```K cb[U`YY': U``g"

9g'[]Vh'Y]bYb'Ni [Ub['ni a 'K UggYfZU``ž'k c'G]Y'g]W\'Ui Z'XYb [fc»Yb'; fUb]hZY`gYb'YbhgdUbbYb'i bX']a 'bUhØf`]W\Yb'Dcc` gW\k]a a Yb'_ÒbbYb"

FY[Ybk U`XVÀi a Y`\Àb[Yb'ØVYf'XYb'FÀbXYfb'XYg'K UggYfZU``g i bX'XYg'6UW\Ygž'k Ug' \Rightarrow bYb'Ub'Y]bYa '\Y]» Yb'Gca a YfhU[']b 7U]fbg'\Y`ZYb'_Ubbž'g]W\'UVni _Ø\`Yb" U`h1 7FMGH5@75G7589G'75 \neq BG'K 5GG9F: \forall @@9ž G7<K \Rightarrow A @C7< \Rightarrow B'89F'B \forall <9'JCB'75 \neq BG 2

K Ug'G]Y']a '7fmghU`'7UgWUXYg'7U]fbg Yfk UfhYh'

 $8 \ Yb \ Yb \ G]Y \ XUfUb \ ZXYb \ 7 \ UgWUXYg \ Y]b \ Yb \ 6 \ Ygi \ WX \ UVni \ ghUhhYb \ 3 \ XYDb \ G]Y \ b \ UWX \ 5 \ h]j \]hAhYb \]b \ 7 \ U]fbg \ gi \ WX \ Yb \ ZXUbb \ k \ \varnothing fXY \]WX \ XYZ]b]h]j \ Ya \ d \ ZY \ Yb \ Za \]b \ XYghYbg \ Y \]b \ Yb \ HU[\ YgUi \ gZi \ [\ ' \]Yf \ Yf \ ii \ j \ YfVf]b[\ Yb''$

K À\fYbX'U``Yg'UbXYfY'gc'k Y]h'k Y['gW\Y]bhž']gh'X]YgYf'K UggYfZU`` k U\fgW\Y]b`]W\'Y]bYf'XYf'bÀW\gh[Y`Y[YbYb'GØ» k UggYf! GW\k]a a VYfY]W\Yž'X]Y'G]Y'Z]bXYb'k YfXYb"'9g']gh'k c\``Ui W\'Y]bYf XYf'gW\ÒbghYb'bUhØf`]W\Yb'CfhY']b'7U]fbgž'U`gc'bY\a Yb'G]Y'g]W\NY]h°

G]Y\Y'Ui W. '8]Y'%\$'VYghYb'Hci fYb'i bX'9f`YVb]ggY']b'7U]fbg

8]Y VYghYb GØ» k UggYf!GWk]a a `OWkYf Z]bXYb '

5i Z'XYa 'GdUn]Yf[Ub['gY\Yb'G]Y'k U\fgW\Y]b`]W\'Y]b][Y Ni [Ub[gdi b_hY'ni 'Y]b][Yb'YfZf]gW\YbXYb'GW\k]a a `ÒW\Yfb Ybh`Ub['XYg': fYg\k UhYf'7fYY_"'K Ybb'G]Y'bUW\'Y]bYa UV[Y`Y[YbYfYb'C fh'ni a 'GW\k]a a Yb'gi W\Ybž'k ØfXY']W\ Ya dZY\`Ybž'Ua '6UW\'Ybh`Ub['ni '[Y\Yb'i bX'g]W\'Y]bYb'D`Uhn Ui qni qi W\Yb" 8]Y'a Y]ghYb'@Yi hY'hfYZZYb'g]W\'Ua 'K UggYfZU``'cXYf'Ub'XYb'YfghYbdUUf'GhY``Yb'i bX'\]bhYf`UggYb'Ybh`Ub['XYf'GhfYW_Y'Y]b][Y'gW\ÒbYžUV[Y`Y[YbY'Dcc`g"

9g'[]Vh'a Y\fYfY'GhY``Yb'a]h'K UggYfž'XUg'h]YZ'[Ybi ['ni a GWk]a a Yb']ghž'U`gc'a UWkYb'G]Y'kY]hYf'i bX'Yf_i bXYb'G]Y'Yg"

- 'U'h1 G7 < K \Rightarrow A ² 7 < 9F ' \Rightarrow '8 9F 'B \ddot{Y} < 9'J CB'75 \neq BGŽ G7 < K \Rightarrow A : @ GG9'75 \neq BG 2
- 'U`h1 7FMGH5@'75G7589G'75∓BG'K 5GG9F: Ÿ@@9ž G7<K → A@C7<'-B'89F'BŸ<9'JCB'75∓BG 2

H]dd. GhY``Yb G]Y g]WX Yfž XUgg G]Y XYb K UggYfghUb X ØVYfk UWX Yb

@Y]XYf'g]bX`\]Yf'a Y\fYfY'A YbgW\Yb'[YghcfVYb"'K À\fYbX'Yg'Ub Y]bYa 'fi \][Yb'HU['g]W\Yf'i bX'i bgW\i `X]['YfgW\Y]bYb'a U[ž_ _\ObbYb'X]Y'7fmghU``7UgWUXYg']b'XYf'FY[YbnY]h'bUW\ q]bhZi hUfh][Yb'FY[YbZ\`Yb'Y]b'[Ubn'UbXYfYg'6]Ygh'gY]b"

Ni a '; 'ØW_'[]Vh'Yg'K UfbgmghYa Yž'X]Y'Hci f]ghYb'i bX'9]b\Y]a]gWXY ['Y]WXYfa U» Yb'k UfbYbž'k Ybb'XYf'K UggYfghUbX'ni '\cW\'k]fX" 8 Ybbc WX'_ObbYb'GØ» k UggYfZØggYž'6ÀWXY'i bX'K UggYfZÀ``Y']b'XYf BÀ\Y'j cb'7U]fbg'Ài » Yfgh'i bj cf\YfgY\VUf'gY]b"'GhY``Yb'G]Y'g]WXYfž XUgg'G]Y'X]Y'6YX]b[i b[Yb'ØVYfk UWXYb'i bX'[Y\Yb'G]Y'Ui Z'_Y]bYb : U```]bg'K UggYfž'k Ybb'G]Y']f[YbXk Y`WXY'Nk Y]ZY``\UVYb" U`h1 7F MGH5@75G7589G'75 \neq BG'K 5GG9F: \forall @@9 \dot{z} G7<K \neq A @C7<' \neq B'89F'B \dot{y} <9'JCB'75 \neq BG'Z

?`]ddYbgdf]b[Yb'Ub'XYb'?f]ghU``_Ug_UXYb

5`g`]W\`Ua`<Ui dhk UggYfZU```j cb`7fmghU``7UgWUXYg`k Ufž'k i fXYba]f`Y]b][Y`_`Y]bY`*!A YhYf!?`]ddYbgdfØb[Y`]b`XYb`h]YZYb`Dcc`
XUfi bhYf`[YnY][h"'8Yf`<Ui dhdcc``]gh'Ui gfY]W\YbX`h]YZž'i a`Ui Z'XYf
fYW\hYb`GY]hY`ni `gdf]b[Ybž'Yg`_ÒbbhYb`^YXcW\`i bhYf[YhUi W\hY
: Y`gYb'j cf\UbXYb`gY]b"

5i ZXYf'gWxfÀ[Yb'; fUb]h_UbhY'_Ubb'Yg'Ui Wx'n]Ya `]Wx'fi hgWx][

k YfXYb"'9]bYb'Gdfi b['ni 'j YfdUggYb'i bX'Ui Z'XYb': Y`gYb'XUfi bhYf ni '`UbXYbž'ZØ\fh'ni 'gWk k YfYb'J Yf`Yhni b[Yb"'9g']gh'Ua 'VYghYbž g]Wk'j cb'Y]bYa '9]b\Y]a]gWkYb'nY][Yb'ni '`UggYbž'k c'a Ub gdf]b[Yb'a i ggž'VYj cf'a Ub'Yg'j Yfgi Wkh"'8Yb_Yb'G]Y'XUfUbž'X]Y GWk]`XYf'fUhYb'⇒bYbž'b]Wkh'ni 'gdf]b[Ybž'U`gc'j Yfk YbXYb'G]Y ⇒fYb'[Ygi bXYb'A YbgWkYbj YfghUbX"

G]bX'X]Y'?f]ghU``_Ug_UXYb'UV[Y`Y[Yb3'

9]b'dUUf'UbXYfY'6`c[gž'X]Y']W\'cb`]bY'[Y`YgYb'\UVYž'\UVYb VY\Ui dhYhž'XUgg'X]Y'7fmghU`'7UgWUXYg'Y]b'`c_U`Yg'; Y\Y]a b]g'g]bX i bX'XUgg'G]Y'g]Y'[Ubn'ZØf'g]W\'U``Y]bY'\UVYb'k YfXYb"

@Y]XYf'k Uf'X]Yg'VY]'a]f'bcW\'b]Y'XYf': U``"'\\\\'\UVY'X]Y'7fmghU` 7UgWUXYg'k \and \fYbX'a Y]bYf'NY]h']b'7U]fbg'i bn\and\`][Y'A U`Y'VYgi W\h i bX'\UhhY'g]Y'b]Y'ZØf'a]W\'U``Y]bY"

 $\label{eq:continuity} $J_{Y^Y}Wh' = UVYg'b'YhnhYf'NYhY'bYb'5bghY' = XYf'Dcdi'UfhAhz' UVYf'Yg'gWXY]bh'XYZ]bh'YYa Y]ghY'NYh'a Y\f'U`g'Y]bY' < UbXj c'`` @Yi hY']a '7UgWUXYg'ni 'gY]b''$

6Yj cf'G]Y'[Y\Yb.'J YfdUggYb'G]Y'b]W\h'X]Y bU\Y'[Y`Y[YbYb': U]fm': U``g

K Ybb'G]Y'bUWX'Yhk Ug'5V[YgWX]YXYbYfYa 'gi WXYbž'[]Vh'Yg'Y]bYbkY]hYfYb'[Y\Y]a Yb'K UggYfZU``'j cf'Cfhž'XYf'g]WX'VY]'XYb'7fmghU`7UgWUXYg'VYZ]bXYh''I a 'Yg'ni 'YffY]WXYbž'a ØggYb'G]Y'ni fØW_'ni a DUf_d`Uhn'7fmghU`'7UgWUXYg'[Y\Yb''5i Z'XYf'`]b_Yb'GY]hY'XYg DUf_d`UhnYg'fa]h'6`]W_'Ui Z'XYb'7fmghU`'7UgWUXYg!DZUXŁ'VYZ]bXYhq]WX'Y]b'_`Y]bYfž'b]WXh'a Uf_]YfhYf'DZUX''

8]YgYf'K Y['gW\`Àb[Y`h'g]W\ 'Xi fW\ 'Y]bY'X]W\ hY FY[Ybk U`Xj Y[YhUh]cbž'VYj cf'Yf'Y]bYb'gdY_hU_i `ÀfYb'_`Y]bYb K UggYfZU```a]h'Y]bYa 'h]YZYb'GW\k]a a `cW\ 'Ybh\Ø``h"

@9G9B'G=9'89B'JC@@GHŸB8 = 9B'6@C; !DCGH.': U]fm': U``gž'H\Y GYWfYh'K UhYfZU`` 'U'h1 : 5 \(\) M: 5 \(\) G'75 \(\) B G 2

$7U]fbgIbhYf_ibZhgZ\emptyset \ fYf Kc ØVYfbUW hYb$

D`UbYb`G]Y`Y]bY`FY]gY`bUW\`7U]fbg`i bX`ZfU[Yb`g]W\ž`k c`G]Y`g]W\b]YXYf`UggYb`gc``Yb3`I bhYb`\UVY`]W\`Y]b][Y`XYf`VYghYb`Cdh]cbYb]b`XYf`BÀ\Y`j cb`7U]fbg`9gd`UbUXY`Ui Z[Y`]ghYh"`=W\`\UVY`Ui W\Y]bYb`i a ZUggYbXYb`I bhYf_i bZhgZØ\fYf`ZØf`7U]fbg`gck]Y`Y]bYbi a ZUggYbXYb`I bhYf_i bZhgZØ\fYf`ZØf`Dcfh`8ci[`Ug`[YgW\f]YVYb"

7fmghU`Vfcc_'F]`Ym' 'K Ybb'G]Y'bUW\'@'lig'ibX'@U[Y'gi W\Ybž']gh XUg'7fmghU`fVcc_'F]`Ym'ibgW\`U[VUf"'8]Yg']gh'XUg'VYghY')!GhYfbY! FYgcfh']b'7U]fbg'ibX'V]YhYh'UVgc`ih'U``Ygž'kUg'G]Y'jcb'Y]bYa 7fmghU`Vfcc_!FYgcfh'YfkUfhYb"

H]dd.; Y\Yb'G]Y'Ui Z'YXYb': U```ni 'FcWWc g'6Uf'Ui Z'XYf'Gd]hnY'XYg 7fmghU`Vfcc_'F]`Ymž'i a 'Y]bYb'[fc»Ufh][Yb'6`]W_'ØVYf'7U]fbg'ni [Yb]Y»Yb°

U`h1 A ÀXWXYb`VY]a `GcbbYbVUXYb`]a `7fmghU`Vfcc_`F]`Ym`FYgcfh]b`7U]fbg 2

FmX[Yg`FYgcfh` '8]YgYg`< chY``V]YhYhY]b`\Yfj cffU[YbXYg`DfY]g!
@Y]ghi b[g!JYf\A`hb]g`ZØf`Y]bYb`Yd]gWXYb`5i ZYbh\U`hini 'Y]bYa
UbghAbX][Yb`DfY]g``8]Y`@U[Y`]gh'dYfZY_hž`]b`XYf`BA\Y`XYf
9gd`UbUXY`i bX`j YfZØ[h'ØVYf`XfY]`Gk]a a]b[dcc`gž`nkY]
HYbb]gd`AhnYž`Y]bYb`K\]f`dcc`ž`Y]b`:]hbYggWYbhYf`i bX`gc[Uf`Y]b
dfY]g[Y_fÒbhYg`FYghUi fUbh"

U`h1 FM8; 9G'9GD@5B589'F9GCFH'&'75\FBG\Z'K C'|BH9F?|B:H NI '6@9\69B 2

:]hnfcm=g`UbX:FYgcfh: 'K Ybb:G]Y:`]YVYf:Ui Z'Y]bYf:XYf:a U`Yf]gWXYb =bgY`b:XYg; fYUh:6Uff]Yf:FYYZ:ØVYfbUWXhYb:a ÒWXhYbž:g]bX:G]Y:]a :]hnfcm=g`UbX:FYgcfh:[YbUi:f]WXh]["'K À\fYbX:G]Y:\]Yf:Y]bYb HU[YgUi gZi ['i bhYfbY\a Yb:_ÒbbYbž:Ya dZY\`Y']WX:Xf]b[YbXž:X]Y BUWXh:ni 'j YfVf]b[Ybž:XUa]h:G]Y:a Y\f:NY]h:\UVYbž:XUg:F]ZZž:X]Y?cfU``YbghfÀbXY:i bX:X]Y:K UbXYfk Y[Y:]a 'FY[Ybk U`X:ni Yf i bXYb"

U`h1 : #NFCM €@5B8 F9GCFH 2

;]``][Ub g'6UW_dUW_Yfg' '8]Y'VYghY'6UW_dUW_Yf!Cdh]cb'Z \emptyset f'Y]bY hc``Y'5ha cgd\AfY']b'7U]fbg']gh';]``][Ub g'6UW_dUW_Yfg"'8Ug'`]Y[h

XUfUbž'XUgg'X]YgYg'Y]bYb'Gk]a a]b[dcc`ž'Y]bY'?`]a UUb`U[Yž'Y]bY _ca d`YhhY'?ØWXY'i bX'Y]bYb'[fc»Ufh][Yb'; Ya Y]bgWXUZhgVYfY]WX \Uhži a 'UbXYfY'FY]gYbXY'ni 'hfYZZYb"

'U'h1 ; =@= 5BG'657?D57?9F'F9GCFH 2

K Y]hYfY: chcg'XYf'?f]ghU``_Ug_UXYbž'i a =\fYb'6Ygi W\'ni']bgd]f]YfYb

Gi W\Yb'G]Y'bUW\'a Y\f': $chcg'XYf'?f]ghU``_Ug_UXYb3'<]Yf'g]bX$ bcW\'a Y\f': $chcg\check{z}X]Y']W\'VY]'a Y]bYb'6Ygi W\Yb'Ub'X]YgYa$ Yd]gW\Yb'Cfh']b'7U]fbg'[Ya UW\h'\UVY $^\circ$

"U`h1 7F MGH5@75G7589G'75 \pm BG'K 5GG9F: \ddot{Y} @9 \ddot{z} G7<K \Rightarrow A @C7< \Rightarrow B'89F'B \ddot{Y} <9'JCB'75 \pm BG'K 5GG9F: \ddot{Y} @9 \ddot{z} G7<K \Rightarrow A @C7< \Rightarrow B'89F'B \ddot{Y} <9'JCB'75 \pm BG'K 5GG9F: \ddot{Y} @9 \ddot{z} G7<K \Rightarrow A @C7< \Rightarrow B'89F'B \ddot{Y} <9'JCB'75 \pm BG' 2

K Y]hYfY 7U]fbg!5VYbhYi YfUfh]_Y`i bX FY]gYZØ\fYf

#W. '\cZYž'XUgg'G]Y'X]YgYb'@Y]hZUXYb'ni a '6Ygi W. 'XYf'7fmghU`
7UgWUXYg']b'7U]fbgž'5i ghfU`]Ybž'\]'ZfY]W. 'ZUbXYb"'#W.'\UVY'ZUgh'Y]b
#U\f'XUa]h'j YfVfUW.hž'U``'X]Y'Yd]gW.Yb'5_h]j]hÀhYb']b'7U]fbg'ni
Yf_i bXYbž'U`gc'gW.Ui Yb'G]Y'g]W.'i bVYX]b[h'a Y]bYb'6`c['Ubž'i a
k Y]hYfY'5VYbhYi Yf]bqd]fUh]cbYb'i bX'FY]qYZØ\fYf'ni 'Yf\U`hYb"

 $\label{eq:local_state} I\ b\ h\ Y\ b\ g]\ b\ X\ Y\]\ b\ '\ [\ i\ h\ Y\ f\ 5\ i\ g[\ U\ b\ [\ g\ d\ i\ b_h\ g]\ b\ X\ ^\circ$

'U`h1 2

п