

SOCW7852

 $Dc^{\dagger}hWg^{\dagger}cZ=hYfbUhcbU^{\dagger}S]X$

HYfa "H\fYY" ## "&\$%-

7ci fgY⁻Cj Yfj]Yk

[']GhJZ'7cbhJWh'8YhJ]`g'

'7cbj Ybcfg'

B Ua Y	9a U]`	5j U]`UV]`] m	@cWUh]cb	D\cbY
A]WXUY``>c\bgcb		A cfj Yb 6fck b	A cfj Yb 6fck b 6i] X]b[F cca %* +	\$('((\$+*)-

GWXcc`7cbHJWhi±bZcfa Uh]cb

GWXcc``cZGcWJU``GWJYbWYg

Fcca '%) -

A cfj Yb 6fck b 7 &\$

Ya U]`. 'gcgg4 i bgk "YXi "Ui

d\cbY. '\$&'-',) '% \$+

7ci fgY 8YHJ] g

7 fYX]h'Dc]bhg'*

Gi a a UfmcZh\Y 7ci fgY

5b']bffcXi Wjcb'tc'th\Y']bflYfbUfjcbU``U]X'U[YbWjYgžth\Y]f'fYgdYWfj Y'gffi Wi fYgžfc`Yg'UbX'fY`Ufjcbg\]dg'k]h\cbY'Ubch\Yf"'5`gc'dfcj]XYg'Ub']bffcXi Wjcb'tc'th\Y']a dUWicZ]bflYfbUfjcbU``YWcbca]Wg'UbX']bflYfbUfjcbU``dc`]fjWg'cb'a UfflYfg'fY`Ufjb['fc']bflYfbUfjcbU``U]X"'9I Ua]bYg'fh\Y'k cf_]b[g'cZ[cj Yfba Ybh'UbX'bcb! [cj Yfba Ybh'U]X'U[YbWjYg'Uhfh\Y'bUfjcbU``UbX']bflYfbUfjcbU```Yj Y`"'H\]g']bZcfa Ufjcb']g'fY`UflYX'fc'WUgY gfi X]Yg'k\]W\XYa cbgffUflY'g_]`g'fc'bY[cfjUflY'k]h\Jb'fbUfjcbU``U]X'gmgflYa gž'gYW fY'Z bX]b[ž'`cVVm UbX'UXj cWUflY fc'fYXYZbY'XYj Y`cda Ybh'Ugg]gfUbW'"

7 ci fgY @YUfb]b['Ci hWca Yg

- %" 8 Ya cbghfuhY 'Ub'i bXYfghUbX]b['cZh\Y'di fdcgYg'cZZcfY][b'U]X 'UbX'h\Y'Z bWhcbg'cZ]bhYfbUh]cbU`U]X'U[YbW]Yg"
- ' " I bXYfgHJbXž]bH/fdfYhiUbX'Wf]hjei Y'h\Y']a dUWg'cZ]bH/fbUhjcbU``XYj Y`cda YbhiUWcfg'cb'h\Y gHi Wi fY'UbX'XY`]j YfmcZU]X"
- ("FYWc[b]qY'UbX'XYVUhY'h,Y'Yh,]Wg'cZU]Xž'UbX'ibXYfghUbX'h,Y]f'ckb'Yh,]WU'dcg]h]cbg"

HYUWX]b[GhfUhY[]Yg

Gh XYbhg UfY Yl dYWYX hc i bXYftU_Y U g][b]Z]WbhUa ci bhcZ]bXYdYbXYbhfYgYUfW]bhc hX i ggi Ygi bXYf Wbg]XYfUh]cb/hc i gY Ub UbU mt]Wb`UddfcUW hc hX i gY UbX hc XYa cbghfUhY hX i gY Ub' Ubd`mthXcfm UbX h]b_ Wf]hWb`m'Gh XYbhg UfY fYgdcbg]V Y Zcfa UbU[]b['hX y]f ck b]bXYdYbXYbh`YUfb]b[ž:UbX Zcf fU]g]b['k]h hX 'Wti fgY Wtbj Ybcf]ggi Yg'cf'dfcV Ya g'h YmYbWti bhYf''Gh XYbhg UfY Yl dYWYX hc hU_Y U dUfh]W]dUhcfmUddfcUW]b WUggYg gc h\ Uh_bck `YX[Y]g g\ UfYXžei YghcbYX UbX XYVUhYX'' DUfh]W]dUh]cb]g bch[fUXYXžVi h]h]g'U'Wti fgY Yl dYWUh]cb h\ UhUgg][bYX fYUX]b[g'k]``VY fYUX h\ cfci [\`mVm'U` dUfh]W]dUbg'df]cf hc YUW gYa]bUf'

5ggYgga Ybh

D`YUgY`bchY`UXX]hjcbU``]bZcfa Uhjcb`cb`h\Y`Wci fgYžgci fWYg`cZ`Ugg]ghUbWY`UbX`ch\Yf`\Y`dZ\`]bZcfa Uhjcb`Zcf`ghi XYbhg`k]``VY`Uj U]`UV`Y`cb`h\Y`Wci fgY`A ccX`Y`g]hY"

GdYWJU`'7cbg]XYfUhJcb

Mci 'WUb'UbX'g\ci `X'Udd`mZcf'gdYWJU`'Wcbg]XYfUhJcb'k\Yb']``bYgg'cf'ch\Yf'WJfW a gHUbWYg']bHYfZYfY k Jh\'mci f'UggYgga Ybh'dYfZcfa UbWY''

 $G] \underline{W}_b Y g g \check{z} a \] g U X j \ Y b h \ f Y \ c f \ c h \ Y f \ W f W a \ g h U b W g \ V Y m c b X \ m c i \ f \ W c b h f c \ a \ U m$

ł DfYj Ybhmci Zfca Wca d`Yhjb['U'Wci fgY'fYei]fYa Ybhz

ł? YYd mci Zfca "UthYbX]b["Ub 'UggYggUV`Y 'UWt]j]tmž'

ł Ghod moi igi Va]hh]b['UggYggUV'Y'k cf_ Zcf'U'Wci fgYž

ł G][b]Zwubhmuzzywnci fidyfzcfa ubwijb uggygguviy k cf_žvyi]hu zcfa uniybx!czgya yghyfiyl ua]buhjcbžu wuggihyghžunuvcfuhcfmihyghžugya]bufidfygybhuhjcb cfiubmich\yfizcfa iczuggygga ybhi

5ggYgga Ybh'HUg_g'

5ggYgga Ybh'tUg_	K Y][\h	8iY'8UhY	Gh XYbh@YUfb]b[Ci hWca Ygʻ5ggYggYX
7 f]h]WU``F YZYWn]cb'	&\$I	\$(#%\$#&\$% `%%) - `DA	% <u>*</u> &. <u>Z</u>
7`Ugg'DfYgYblUljcb'	' \$1	Bch5dd`]WUV`Y	%₹
F YgYUfWX 'YggUm') \$1	&) #%#&\$% `%%) - `DA	%ž&Ž Ž(

5ggYgga Ybh8YHJ]`g

5ggYgga Ybh% 7f]hJWU`FYZYWhJcb

GhUfhXUhY. Bch5dd`]WUV`Y

@Yb[h.:%\\$\$\$ kcfXg`]bWiX]b[`ZcchbchYg`UbX`UhUWXaYbhg\zerovi hibch]bWiX]b[`h\Y`V]V`]c[fUd\m'

 $8 YHJ)^*g. \\ "5 ggYgga Ybh'8 YgWf]dh]cb. \\ \% $\$'K cfX'fbch']bWi X]b['h\Y'V]V)^c[fUd\m^2Wf]h]WU''fYZYWf]cb'cb'U ei Ygh]cb'VUgYX'cb'h\Y'fYUX]b[g'']b'Hcd]Wg'%UbX'&"''': YYXVUW_. \\ "K f]hhYb'ZYYXVUW_UbX'[fUXYX'fi Vf]W k]h\]b'fk c'k YY_g$

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

H\Y'g\cfnk f]thYb'Ugg][ba YbhUg_g't\Y'ei Ygt]cb'fk \Uh]g'5]X'UbX'k \UhUfY't\Y'V][[YghX]Z]W'`t]Yg'mci

YbWci bhYf`]b`Ubgk Yf]b['h\Y'ei Ygh]cb3'``

dfYgYbhUhjcb"·····	•
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5XX]h]cbU`XYhJ]`g.

 $H\g`UggYgga\Ybh']g`dfYdUf]b[`U``)`a]bi hY`gYa]bUf`dfYgYbhUh]cb`fk]h\`Dck Yf`Dc]bhgŁ`UbX`U`) $$ k cfX gi a a UfmVf]YZ]b[`gi a a UfmdUdYf`fk]h\`fYZYfYbWfg``]ghYX`k \YfY`fYei]fYXŁ`]b`bca]bUhYX`k YY_"`J U`i Y`— '$i `cZh\Y`Wci fgY`hchU``fcZ%$$i Ł"`8i f]b[`gYa]bUfg`]b`h\Y`Wci fgY`hYUW\]b[`k YY_g`k \YfY`ghi XYbhg`a i gh UhYbX`Z̄ca `I BGK `K YY_g`&'hc`%$žghi XYbhg`k]```VY`Ugg][bYX`cbY`ei Ygh]cb`cb`k \]W\`h\Ymk]```YUX X]gW gg]cb"$

EfgvW fei [^bdWbSdWS dfygYbhUh]cb'h\UhX]fyWhmUbgk Yfg'U'gYa]bUf'ei Ygh]cbz'a YYhg'h\Y'Xchdc]bh fyei]fya Ybhg'Zcf'Ub'YZZyWh]j Y'dfygYbhUh]cb']b'h\Y'[i]XY`]bYg'Zcf'h\]g'UggYgga YbhHUg_'dfcj]XYX']b'h\Y Wci fgY'A ccX'Y'g]hY'UbX'fU]gYg'h\Y'&!' 'a cgh']a dcffUbhei Ygh]cbg'Zcf'Z fh\Yf'X]gW gg]cb"'H\Y'cj Yf\YUXg UbX'Vf]YZ]b['dUdYf'a i ghVY'gi Va]hHYX']b'h\Y'Hi fb]h]b'Xfcd'Vcl''&\'ci fg'VYZcfY'h\Y'dfYgYbhUh]cb"

Ghi XYbhg a i ghYbgi fY h\Ym

5 bgk Yf'bca]bUh'X'gYa]bUf'ei Ygh]cbfgŁ'UbX. '7 f]h]ei Y'cf'XYZYbX'dUfh]W `Uf'fYUX]b[g/F YZYWicb'Ubm i bYl dYWYX']bg][\hgzcf'gi fdf]gYg''h\YmYbWci bhYf']b'h\Y'fYUX]b[g"

Ghi XYbhgʻdfYdufY`Uʻg\cfh\UbXci hhcʻUVWta dUbmmci fʻdfYgYbhUhjcbʻhcʻVYʻgYbhhcʻh\Y`Wti fgY`7 cbj Ybcf UbXʻhi hcfʻh\Y`XUmVYZcfYʻmci fʻgYa]bUfʻj]Uʻh\YʻgYa]bUfʻHi fb]hjbʻXfcdʻVclʻ]bʻA ccX`Y`UʻWtdmh\Uhih\Y Wtbj Ybcfʻk]```i gYʻZcfʻk f]hhYbʻZYYXVUW_hcʻYUW\`ghi XYbh'

Gi Va]gg]cb'bchYg.9UW\ gh XYbhg'gYa]bUf'dfYgYbhUh]cb'UbX'6f]YZ]b['DUdYf'k]``VY'Ugg][bYX']b'K YY_'% Zcf'Wca d'Yh]cb'UbX'dfYgYbhUh]cb']b'h\Y'Ugg][bYX'kYY_'VYhk YYb'kYY_g'&'UbX'\%"

Hi fb]h]b gYh]b[. `H\]g Ugg][ba Ybh]g gi Va]hhYX h\fci [\`Hi fb]h]b UbX gh XYbhg Xc bchgYY Hi fb]h]b g]a]`Uf]hmfYdcfhg"

5ggYgga Ybh' . F YgYUfWX YggUm

GhUfh'XUhY. \$(#%#&\$% '%%) - DA

@Yb[h\. 82) \$\$ k cfX f]bWi X]b[ZcchbchYg Vi hbch]bWi X]b[V]V]c[fUd\m2 fYgYUfWX YggUm'

8 YHU]`g. ``5 ggYgga Ybh8 YgWf]dh]cb. `&z) \$\$ 'k cfX``fbch']bWl X]b['V]V`]c[fUd\m2`fYgYUfW. `YggUmcb`U`X]ZZYfYbh hcd]Whc'h\UhUXXfYggYX`]b'h\Y`g\cfhk f]HYb`YggUmUbX`h\Y'h\Y`dfYgYbHJh]cb`Ugg][ba Ybh'F YgYUfW. 'hcd]Wgbch`]ghYX`WJb`VY`UXXfYggYX`k]h\'h\Y`k f]HYb'dYfa]gg]cb`cZh\Y`````YWh fYf": YYXVUW_.; fUXYX fi Vf]WUbX`k f]HYb'Wca a YbhJfm"

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

9ggUmei Ygh]cbg'k]```VY'cbY'gY`YWhYX'Zfca 'h\Y'ei Ygh]cbg'dcgYX']b'gYa]bUf'hcd]Wg'' 'hc'%\$'cb`m' 9ggUmg'k]```VY'UggYggYX'U[U]bgh'h\Y'Zc``ck]b['Wf]hYf]U.

- Ei U']hmcZ'UbU`mg]g. '8cYg'h\Y'YggUm'Ubgk Yf'h\Y'ei Ygh]cb'UbX'a U_Y'U'Wcbg]ghYbhz``c[]\W\`Uf[i a Ybh3'<ck 'k Y```XcYg']hYb[U[Y'k]h\'Wca dYh]b['dYfgdYWhj Yg3'8cYg']h]XYbh]ZmUbX'Wcbhf]Vi hYbc'fY`Yj UbhXYVUhYg3'8cYg']hUXYei UhY`mXYZ]bY'_YmWcb\Wdhg'UbX']XYbh]Zmi bXYf'm]b[Uggi a dh]cbg3
- EiU`]mcZ`] $hYfUhi fY`UbX`Yj]XYbWY. = h\Y`Uf[iaYbhgiddcfhYX`VmUddfcdf]UhY`Yj]XYbWY3`=g$

 $\label{thm:condition} \verb"h\YfY'gi Z] W Y bhVfY UXh `cZfYgci fW g3'8 cYg'h Y'YggUmgY`YWhUddfcdf] UhY``] hYfUhi fY'Zfca 'h Y'YggUmgY'YWhUddfcdf] UhY'`] hYfUhi fY'Zfca 'h Y'YggUmgY'Y Wh'Uddfcdf] UhY'' YggUmgY'Y YggUmgY'Y Wh'Uddfcdf] UhY'' YggUmgY'Y YggUmgY'Y$

5 http://bxubww.F.Yei]fYa Ybhq

5 hYbXUbWY F Yei]fYa Ybhg

Hi fb]h]b Gi Va]gg]cb

Image: Ybwci bhYf'U'dfcV'Ya k \Yb'UhYa dhjb['hc'gi Va]hmci f'Ugg][ba Ybhh\fci [\ 'Hi fb]h]bž'd'YUgY

HY'Yd\cbY'9| hYfbU''Gi ddcfhcb'-',) "''' %cf'Ya U]''h\Ya 'cb'Y! hYfbU'hY'hgi ddcfh4 i bgk "YXi "Ui "'Gi ddcfh
\ci fg'UfY', .\$\$Ua '-'%\$.\$\$da 'cb'k YY_XUmg'UbX'-.\$\$Ua '-').\$\$da 'cb'k YY_YbXg'fl *) 'XUmg'U'mYUft"'=Z'mci
UfY'i bUV'Y'hc'gi Va]hmci f'Ugg][ba YbhXi Y'hc'U'ZJi 'hk]h\ 'Hi fb]h]b'mci 'a UmUdd'mZcf'Ub'Y! hYbg]cbž'Vi hmci
a i ghfYhJ]b'mci f'h]\W_Yhbi a VYf'Zfca '9! hYfbU''Gi ddcfhfU'cb['k]h\ 'Ubmch\Yf'fY'Yj UbhXcW a YbhgŁ'hc
]bWi XY'Ug'Yj]XYbWY'hc'gi ddcfhmci f'Y! hYbg]cb'Udd']\WJh]cb"'=Zmci 'Ya U]''9! hYfbU''Gi ddcfhmci 'k]'`
Ui hca Uh]\WJ'`mfYWY']j Y'U'h]\W_Yhbi a VYfž'Vi h]Zmci 'hY'Yd\cbY'mci 'k]``bYYX'hc'gdY\WZ]\WJ'`mUg_'Zcf'cbY''
Hi fb]h]b'U'gc'dfcj]XYg'i dXUhYg'cb'h\Y]f'gmghYa 'ghUh' g'cb'Hk]hYf''

Gi Va]hh]b[5ggYgga Ybh@UhY

5b'UggYggYX'HJg_']g'XYYa YX'`UhY']Z]h']g'gi Va]hhYX'UZhYf'h\Y'gdYWZ[YX'h]a Y'UbX'XUhY'Ug'gYhci h']b'h\Y

I		

		%*\$\$`!% \$\$`\fg`]b``A Uh\Yk g`6i]`X]b[`Fcca `&&+
		K YY_`%
		BchY'h\Y'Zi```WcifgY'dfc[fUažfYUX]b[``]ghgžZi`` WU`YbXUf'UbX'giddcfh]b['a UhYf]U`g'UfY'cb'h\Y WcifgY'AccX`Y'g]hY'UbX'U``'WcifgY'dUfh]W]dUbhg aighaU_Y'h\YagY`jYg'ZUa]`]Uf'k]h\'U``'h\Y aUhYf]U`g'h\YfY
		7 cbj Ybcfa YYhg'h\Y'Wci fgY'dUfhjWjdUbhg'UbX ci h`jbYg'h\Y'_Ym'UgdYWhg'cZh\Y'Wci fgY'dfc[fUa 'UbX UggYgga Ybh'
		7 cbj Ybcf`]blfcXi Wfg`Hcd]W%z'K \Uh]g XYj Y`cda Ybh3`K \Uh]g`U]X3`K \Uh]g
		dc`]hJWU`'UbU`mg]g3'
		DfYgYbhUhjcbihcd]WgiZcfik YY_gi&ihcii%%iUfYiUgg][bYXhcighi XYbhg"
		±DZcfa Uhlcbi]gidfcj]XYXicbifYgYUfWXiUbX dfYdUfUhlcbicZh\Yi]a dcfhUbhiZlfghUggYgga YbhiHUg_! Ui‰\$\$\$YggUmk \]WXik]``[Yhighi XYbhgii dihcigdYYX cbih\Yi_bckiYX[YiZ]YiXiUbXik\Uh]giYI dYWYXi]b hYfa gicZdUfh]WdUh]cbžfYgYUfWXiUbXik f]h]b["
		H\Y'7cbj Ybcf']g'Uj U]`UV`Y']b'A cfj Yb'6fck b Fcca '%&'Zfca''!(da 'cb'Yj YfmgYa]bUf'b][\h Zcf'Wcbgi `HJh]cb''cb'h\Y'Wci fgY'cf'h\Y XYj Y`cda YbhgYWcf'[YbYfU``m''
K YY_'&.'&' 'GYdhYa VYf'! &+'GYdhYa VYf	GYa]bUf	A cbXUm'&' fX cZ'GYdhYa VYf
IX+ GYUIFA VYI		A Uh\Yk g'6i]`X]b['Fcca '&&+'(!*da
		K YY_'&'GYa]bUf
		H\Y`GYa]bUf`UW¶j]]mm]g`X]j]XYX`fci[\`m]bhc`lk.cdUfhg`YUW\`kYY_"
		:]fghh\YfY`UfY`dfYgYbfUhcbg`Vm]bX]j]Xi U``gh XYbhg UbX`[fci d`k cf_'cb'h\Y`hcd]\Mg`UbX`fY`UhYX`ei Ygh]cbg A]\W\UY``]bffcXi \Wg`]b'h\Y`dfYj]ci g`k YY_"`Gh XYbhg k]```\UbX`h\Y`7 cbj Ybcf`U`\&dmcZh\Y]f`cj Yf\YUXg UXXfYgg]b['h\Y]f`hcd]\Wei Ygh]cb'UbX`di hh\Y]f Vf]YZ]b[']bhc'U'Hi fb]h]b`Xfcd`VcI 'k \]\W`k]``bchVY gYYb`Vmh\Y`ch\Yf`gh XYbhg"
		#5'T BGK 'K YY_'%'h\Y'hcd]W]bhcXi WYX'k Ug''K \Uh']g XYj Y`cda Ybh3'K \Uh']g'U]X3'K \Uh']g'dc`]h]WU`

		UbU`mg]g3'.H\Y'h\fYY'ei Ygh]cbg'fY`UhYX''hc'h\]g'hcd]WUfY``]ghYX'cb'h\Y'A ccX`Y'g]hY'UbX'dfYgYbh]b[gh XYbhg'k]``Z]bX'U'Dck Yf'Dc]bhDfYgYbhUh]cb'cb'h\Yhcd]WUbX''fYUX]b[g'dfcj]X]b['X]ZYfYbhdYfgdYWf] Ygcb'h\Y'hcd]WUbX'Yj]XYbW''\Y`dZ'``]b'Ubgk Yf]b['h\Yei Ygh]cb" H\Y'DfYgYbhUh]cb'UbX'[fci d'kcf_']g'Zc``ck YX'VmUb]bhfcXi WcfmVf]YZ]b['Vmh\Y'7cbj Ybcf'cb'h\YZc``ck]b['kYY_g'dfYgYbhUh]cb'fk\]W\']g'Zcf'gh XYbhdfYgYbhUh]cbg'UbX'[fci d'X]gW'gg]cbg']b'K YY_'' Ecbh\Y'hcd]W''f5i ghfU`]Ub']bhYfbUh]cbU`'U]Xf'i
		5```ghiXYbhg`g\ci`X`\UjY`Wcad`YhYX`h\Y`cb`]bY f9`]gYfidfc[fUa`Zfca`h\Y`@YUfb]b[`7YbhfY`Vmh\Y YbX`cZKYY_`&`]Zh\Ym\UjYbfhiXcbY`]hdfYj]cig`m"
K_YY_" ." \$"GYdhYa VYf"! ("CWcVYf	GYa]bUf	I BGK 'K YY_"
		GYa]bUf
		A cbXUm' \$h\ cZGYdhYa VYf
		A Uh\ Yk gʻ6i]`X]b['F cca '&&+'(!*da
		Bca]bUhYX'ghiXYbhg'dfYgYbhž'X]gWigg'UbX'\UbX']b Vf]YZ]b['dUdYfg'cb'Hcd]W&'f#\Y'dc`]h]Wg'cZ 5ighfU`]Ub'U]Xf'i
		H\Y`7 cbj Ybcf`]blfcXi Wfg`Hcd]W' ž'6]`UlfYfU` fYgci fWf`lfUbgZYfg.`dck Yfž'dc`]WfiUbX`dfc[fUa g`Zcf k \ca 3'
		Ghi XYbhgʻgi Va]hʻ5gg][ba Ybhʻ%Vma]Xb][\hcb cbʻh\Yʻ: f]XUmh\Yʻ(h\ CWhcVYfʻ]bʻh\YʻHi fb]h]b XfcdʻVclʻcbʻh\YʻWci fgYʻA ccX`Yʻg]hY"
		H\Y`7 cbj Ybcf`]g`Uj U]`UV`Y`]b`A cfj Yb`6fck b`F cca %&`Zfca '' !(da `cb`Yj YfmgYa]bUf`b][\h'Zcf Wcbgi `HUf]cb``cb`H\Y`Wci fgY`cf`H\Y`XYj Y`cda Ybh gYWrcf`[YbYfU``m''
K YY_'(.'+'CWcVYf'!'%% CWcVYf	GYa]bUf	A cbXUmh\Y`+h\`cZ'CWrcVYf`]g`U`di V`]W <c`]xum UbX`bc`gYa]bUf`k]```VY`\Y`X"</c`]xum
K YY_').'%('CWhcVYf'!'%, CWhcVYf	GYa]bUf	A cbXUm% (h. C WhcVYf
C VVC V I I		%*\$\$`!%\$\$`\fg`]b``AUh\Ykg`6i]`X]b[`Fcca`&&+
		K YY_`)
		GYa]bUf'DfYgYbhJh]cbgžga U``[fcid'X]gWgg]cbUbX'd`YbUfmhcd]W'6]`UhYfU`U]X'Zcf'k\ca3

		Hcd]WVf]YZ]b['Vmh\Y'7cbj Ybcf. ' <i "h\]g="" '%&zfca''!(da'cb'yj="" \hgž=""]hmk]```bchvy'zcfa=""]va]hhc'h\y'accx`y'xfcd'vci="" ``zcf'h\y]f'dfygybhufh]cbg="" `huh]cb''cb'h\y'wci="" a="" b="" f][="" fcca="" fgy'cf'h\y="" fwyg="" ghi="" gyzi="" h\y'7cbj="" h]cbg="" hc'dfydufy'u``]ghcza="" th="" u]`uv`y'cb`]by'i="" u]`uv`y`]b'acfj="" u]xž]bgh]hi="" u``muggyggyx'''<="" ub="" ubx'gi="" ubx'xyj="" uj="" uwh]j="" xybhg="" xyj="" y`cda="" yb'6fck="" ybcf`]g'uj="" ybh'="" ybhgywrcf'[="" ybyfu`m''="" yfmgya]buf'b][\h="" yx]u'fygci="" zcf'wcbgi=""></i>
		ong jima ji sama sara sa maggaggan
K YY_'*.'&%'C WcVYf'!'&)		A cbXUm&%ghCWrcVYf
C WcVYf		%* \$\$`!% \$\$`\fg`]b``A Uh\Yk g`6i]`X]b[`Fcca `&&+
		K YY*
		GYa]bUf`DfYgYbhJh]cbgžga U```[fci d`X]gW gg]cb UbX`d`YbUfmhcd]W` <i \hgž]bgh]hi="" a="" h]cbgž<br="" ub`f][="">U]X`UbX`XYj Y`cda Ybh</i>
		Hcd]WVf]YZ]b['Vmh\Y'7cbj Ybcf.'5VWci bhUV]`]hm cZ]bX]j]Xi U`g'UbX']bgh]hi h]cbg']b'h\Y'XY`]j Yfm cZ'U]X"
		H\Y'7cbj Ybcf']g'Uj U]`UV`Y']b'Acfj Yb'6fck b Fcca '%&'Zfca''!(da'cb'Yj YfmgYa]bUf'b][\h Zcf'Wcbgi`HJh]cb''cb'h\Y'WcifgY'cf'h\Y XYj Y`cda YbhgYWrcf'[YbYfU``m''
K YY_'+.'&, 'C WcVYf'!'%	GYa]bUf	AcbXUm&, h\CWhcVYf
Bcj Ya VYf		%* \$\$`!% \$\$`\fg`]b``A Uh\Yk g`6i]`X]b[`Fcca `&&+
		K YY_'+
		GYa]bUf DfYgYbHJhcbgžga U``[fcidX]gW gg]cb UbXdYbUfmhcd]W5VWcibHJV]`]hmcZ]bX]j]XiU`g'UbX]bgh]h h]cbg`]b'h\Y`XY`]j YfmcZU]X"
		Hcd]WVf]YZ]b['Vmh\Y'7cbj Ybcf.'FY[i `Uh]b['U]X. k \cž\ck 'k Y``'UbX'k \c'VYbYZ]hg3
		H\Y`7cbj Ybcf`]g`Uj U]`UV`Y`]b`A cfj Yb`6fck b Fcca '%&:Zfca '' !(da 'cb`Yj YfmgYa]bUf`b][\h Zcf`Wcbgi `HJh]cb`'cb`h\Y`Wci fgY`cf`h\Y XYj Y`cda YbhgYWrcf`[YbYfU``m''
K YY_', . '('Bcj Ya VYf'!', Bcj Ya VYf	GYa]bUf	A cbXUm(h\ Bcj Ya VYf
-	•	•

I		%* \$\$`!% \$\$`\fg`]b``A Uh\Yk g`6i]`X]b[`Fcca `&&+
		K YY_',
		GYa]bUf`DfYgYbHJh]cbgž'gaU```[fcid'X]gWgg]cb'UbXd`YbUfmhcd]W'FY[i`Uh]b['U]X.' <ck'ky``'ubx'k\cvybyz]hg3< td=""></ck'ky``'ubx'k\cvybyz]hg3<>
		Hcd]WVf]YZ]b['Vmh\Y'7 cbj Ybcf.'5]X'YZ]W]YbWnUbX YZYW1ji YbYgg.'A cfY'cf"Ygg'U]X3
		H\Y`7cbj Ybcf`]g`Uj U]`UV`Y`]b`A cfj Yb`6fck b Fcca '%&:Zfca '' !(da 'cb`Yj YfmgYa]bUf`b][\h Zcf`Wcbgi `hUh]cb`'cb'h\Y`Wci fgY'cf'h\Y XYj Y`cda YbhgYWrcf`[YbYfU``m''
K YY_''%%Bcj Ya VYf'! %'Bcj Ya VYf		A cbXUmi%%h\ Bcj Ya VYf
		%*\$\$`!% \$\$`\fg`]b``A Uh\Yk g`6i]`X]b[`Fcca `&&+
		K YY_'-
		GYa]bUf`DfYgYbłUł]cbgž'gaU```[fcid'X]gWgg]cb'UbXd`YbUfmhcd]W'5]X'YZ]W]YbWhiUbX'YZYWf]jYbYgg. AcfY'cf'`Ygg'U]X3
		Hcd]WVf]YZ]b['Vmh\Y'7cbj Ybcf.''HUf[Yh]b['U]X'Uh bYYXg'UbX'X]gWf]a]bUh]cb"
		H\Y'7cbj Ybcf']g'Uj U]`UV`Y']b'A cfj Yb'6fck b Fcca '%&'Zfca''!(da cb'Yj YfmgYa]bUf'b][\h Zcf'Wcbgi`HUh]cb''cb'h\Y'Wci fgY'cf'h\Y XYj Y`cda YbhgYWrcf'[YbYfU``m'
		DfYdUfY g\cfhUbbcHJHYX V]V`]c[fUd\mcbgci fWfg Uj U]`UV`Y tc UXXfYgg h\Y a U'cf fYgYUfWX YggUmtcd]W'Gi Va]hth\fci [\`A ccX`Y"H\]g UWh]j]tmk]``bchVY Zcfa U``mUggYggYX Vi h]g XYg][bYX tc [Yhth\Y a U'cf fYgYUfWX Ugg][ba YbhibXYfk Um'
K YY_"%\$."% "Bcj Ya VYf"!	GYa]bUf	A cbXUm'% h\ Bcj Ya VYf
&& Bcj Ya VYf		%*\$\$`!%\$\$`\fg`]b``A Uh\Yk g`6i]`X]b[`Fcca`&&+
		K YY_'%\$
		GYa]bUf`DfYgYbHJhjcbgž'ga U```[fci d`X]gW gg]cb`UbX d`YbUfmhcd]W`HUf[Yhhjb[`U]X`Uhi f[YbhbYYXg`UbX X]gWf]a]bUhjcb
		d`YbUfmhcd]W'HUf[Yh]b['U]X'Uhi f[YbhbYYXg'UbX

FYgci fWfg

DfYgWf]VYX F Ygci fWYg

 $H\Y'I BGK "@]VfUfmik YVg]hY"]g"Uj U]"UV"Y"Uh'\hnd. \#k k k "`]VfUfm'i bgk "YXi "Ui "'Mci "bYYX"hc"VY"ZJa]`]Uf"k]h\U```UgdYWhg"cZh\Y'I BGK "@]VfUfmUg"gccb"Ug"mci "VY[]b"mci f"ghi X]Yg"UhI BGK "$

.

H\Y``]VfUfmfi bg`h\Y`9@\G9`h hcf]U``cb!`]bYžk\]W\`ZJa]`]Uf]gYg`gh XYbhg`k]h\`UWUXYa]Wkf]h]b[ž`fYgYUfW\UbX`ig]b[`]bZcfaUh]cb`fYgdcbg]V`m'`\#\WUb`VY``c\WHYX`Uh`\\hd.#\Y`]gY"`]VfUfm'i bgk\"YXi\"Ui\Aca\Y\X\Y\\ha\"\ha\"\

.

 $H\YfY^{-1}g^{-1}bc^{-1}W^{-1}f^{-1}K^{-1}+,\)\ \&'Vi\ hgca\ Y^{-1}VUg]Wgci\ fW^{-1}g^{-1}bc^{-1}[Yhmci\ ^{-1}ZUa\]^{-1}Uf^{-1}k\]h^{-1}h^{-1}h^{-1}Y^{-1}JY^{-1}bW^{-1}XY.$

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

Hi fb]h]b Gi Va]gg]cb

Image: Ybwci bhYf'U'dfcV'Ya k \Yb'UhYa dhJb['hc'gi Va]hmci f'Ugg][ba Ybht\fci [\ 'Hi fb]hJbž'd'YUgY

HY'Yd\cbY'9| hYfbU''Gi ddcfhcb'-',) '' ' ' %cf'Ya U] 'h\Ya 'cb'Y! hYfbU'hY'hgi ddcfh4 i bgk "YXi "Ui '"'Gi ddcfh
\ci fg'UfY', .\$\$Ua '-'\\$.\$\$da 'cb'k YY_XUmg'UbX'-.\$\$Ua '-') .\$\$da 'cb'k YY_YbXg'fl *) 'XUmg'U'mYUfŁ" Image:

UfY'i bUV'Y'hc'gi Va]hmci f'Ugg][ba YbhXi Y'hc'U'ZJi 'hk]h\ 'Hi fb]hJb'mci 'a UmUdd'mZcf'Ub'Y! hYbg]cbž'Vi hmci
a i ghfYhJ]b'mci f'hJW_Yhbi a VYf'Zfca '9! hYfbU''Gi ddcfhfU'cb['k]h\ 'Ubmch\Yf'fY'Yj UbhXcW a YbhgŁ'hc
]bWi XY'Ug'Yj]XYbW' 'hc'gi ddcfhmci f'Y! hYbg]cb'Udd']WUh]cb" Image: Ya U]''9! hYfbU''Gi ddcfhmci 'k]''

Ui hca UhJWJ''mfYW'] Y'U'hJW_Yhbi a VYfž'Vi h]Zmci 'hY'Yd\cbY'mci 'k]'''bYYX'hc'gdYWJZWJ''mUg_'Zcf'cbY"

Hi fb]hJb'U'gc'dfcj]XYg'i dXUhYg'cb'h\Y]f'gmghYa 'ghUh' g'cb'Hk]hYf"

; YbYfU``mž'UggYgga YbhiHug_g'a i ghVY'gi Va]hhYX'Y`YVWfcb]\W)``mj]U'Y]h\Yf'Hi fb]hjb'cf'U'A ccX`Y Ugg][ba Ybh'' =b']bgHJb\W'g'k \YfY'h\]g']g'bchdcgg]V`Yž']hk]``'VY'gHJhYX'cb'mci f'\\circ i fgY'g'A ccX`Y'g]hY'k]h\ U`hYfbUhj Y'gi Va]gg]cb'XYHJ]`g''

cfi]bZcfa Uh]cbicbi\ckihcigi Va]hUgg][ba Ybhgicbi]bYij]UiA ccXiY.i\hdg.#gh XYbh'i bgk "YXi "Ui #\ck! qi Va]hUgq][ba Ybha ccXiY

5 WUXYa]W<cbYghmUbX D`U[]Uf]ga

D`U[]Uf]ga `]g`i g]b['h\Y`k cfXg`cf`]XYUg`cZch\Yfg`UbX`dfYgYbh]b['h\Ya `Ug`mci f`ck b"'=hWJb'hU_Y`a Ubm Zcfa gžZfca `XY`]VYfUhY`W\YUh]b['hc`UWW]XYbhU`mWcdm]b['Zfca `U`gci fWY'k]h\ci hUW_bck `YX[Ya Ybh'

IBGK [fcidg'd'U[]Uf]ga]bhc'h\Y'Zc``ck]b[WUhY[cf]Yg.

7 cdm]b[.'i g]b['h\Y'gUa Y'cf'j Yfmg]a]`Uf'k cfXg'hc'h\Y'cf][]bU`hYl h'cf']XYU'k]h\ci h'UW_bck `YX[]b['h\Y gci fW'cf'i g]b['ei chUh]cb'a Uf_g"'H\]g'U`gc'Udd`]Yg'hc']a U[Ygž'Ufh'UbX'XYg][b'dfcYWhgž'Ug'k Y``'Ug dfYgYbhUh]cbg'k \YfY'gca YcbY'dfYgYbhg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci h'WfYX]h'

⇒ Uddfcdf]UhY 'dUfUd\fUg]b[...7\Ub[]b['U'ZYk 'k cfXg'UbX'd\fUgYg'k \]'Y 'a cghmfYhJ]b]b['h\Y'cf][]bU` ghfi Wh fY 'UbX#cf'dfc[fYgg]cb'cZ]XYUg'cZh\Y'cf][]bU'žUbX']bZcfa Uh]cb'k]h\ci hUW_bck `YX[Ya Ybh'H\]g'U`gc Udd`]Yg']b'dfYgYbhUh]cbg'k \YfY'gca YcbY'dUfUd\fUgYg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci hWfYX]hUbX'hc d]YW]b['hc[Yh\Yf'ei chYg'UbX'dUfUd\fUgYg']bhc'U'bYk 'k \c`Yžk]h\ci hUddfcdf]UhY'fYZYfYbW]b["

7 c``i g]cb.'k cf_jb['k]h\ch\Yfg'Vi hdUgg]b['cZZh\Y'k cf_'Ug'U'dYfgcb'g']bX]j]Xi U``k cf_"'7 c``i g]cb'U`gc]bWi XYg'dfcj]X]b['mci f'k cf_'hc'Ubch\Yf'ghi XYbhVYZcfY'h\Y'Xi Y'XUhYžcf'Zcf'h\Y'di fdcgY'cZh\Ya d`U[]Uf]g]b['UhiUbmh]a Yž'dUm]b['Ubch\Yf'dYfgcb'hc'dYfZcfa 'Ub'UWUXYa]WhUg_ž'ghYU']b['cf'UWei]f]b[Ubch\Yf'dYfgcb'g'UWUXYa]Wk cf_'UbX'Wcdm]b[']hz'cZYf]b['hc'Wca d'YhY'Ubch\Yf'dYfgcb'g'k cf_'cf'gYY_]b[dUma YbhZcf'Wca d'Yh]b['UWUXYa]Wk cf_"

±bUddfcdf]UhY`W]hUh]cb.`7]h]b[ˈgci fWYg'k\]WX`\Uj Y`bchVYYb`fYUXžk]h\ci hUW_bck`YX[]b[`h\Y`″gYWcbXUfm″gci fWY`Zfca 'k\]WX`_bck`YX[Y`cZh\Ya`\Ug'VYYb`cVhU]bYX"

8 i d`]\WUh]cb`ffgY`Zd`U[]\Uf]ga "Ł gi Va]\h]b[`mci f`ck b`k cf_ž]b`k \c`Y`cf`]b`dUfhžk \YfY`]h\Ug`dfYj]ci g`m VYYb`dfYdUfYX`cf`gi Va]\hYX`Zcf`Ubch\Yf`UggYgga Ybhcf\Wci fgY`UhI BGK `cf`Ubch\Yf`i b]j Yfg]\m'

7 cffYWnfYZYfYbWlb['dfUWnWyg.

- DUfUd\fug]b[ž'gi a a Uf]g]b[ž'YggUmk f]h]b["UbX"h]a Y a UbU[Ya Ybh
- 5ddfcdf]UhY'i gY'cZUbX'Uhf]Vi h]cb'Zcf'U'fUb[Y'cZa UhYf]U`g']b\$

‰ ∪,

- i bXYfgHUbX'mci f'f][\hg'UbX'fYgdcbg]V]`]h]Yg'Ug'U'gh XYbhUhI BGK
 VY'Uk UfY'cZd`U[]Uf]ga ž'Wcdmf][\hz'I BGK 'Gh XYbh7cXY'cZ7cbXi WhUbX'5VWWdhUV`Y'I gY'cZ IBGK =7 HF Ygci fWrg Dc`]Wh

5 WUXYa]W±bZcfa Uhjcb