

ARTS2092

; `cVU``A YX]U. A Uf_Yhgž: `ck g'UbX'7i `hi fYg

HYfa 'Hk c''# '&\$&\$

7ci fgY Cj Yfj]Yk

GHJZZ7cbHJWh8YHJ]`g

7cbj Ybcfg

| B Ua Y | 9a U]` | 5j U]`UV]`]lm | @cWUh]cb | D\cbY |
|-------------|--------|------------------------------------|---------------------------------------|-------|
| GWcHiG\UbYf | 0 0 | C b`]bY'j]U'Ya U]` UbX'A ccX`Y | gYY ⁻ A ccX ⁻ Y | B#5 |

Hi hcfg

| BUa Y | 9a U]` | 5j U]`UV]`] m | @cWJhjcb | D\cbY |
|--|------------------------------|------------------------|----------|--------------|
| 5mYg\U' <ugub< td=""><td>UmYg\U"\UgUb4 i bgk "YXi "Ui</td><td>cb`]bY'j]U'Ya U]`'UbX</td><td>]b WUgg</td><td>B<i>#</i>5</td></ugub<> | UmYg\U"\UgUb4 i bgk "YXi "Ui | cb`]bY'j]U'Ya U]`'UbX |]b WUgg | B <i>#</i> 5 |
| | | A ccX`Y | | |

GWXcc`7cbHJWhi±bZcfa Uhjcb

GWXcc`cZh\Y'5fhg'UbX'AYX]U

Fcca " %&ž@Yj Y`" žFcVYfhK YVghYf'6i]`X]b[ff %(Ł

D\cbY. 'f\$&Ł'-',) '(,) *

9a U]` gUa 4 i bgk "YXi "Ui

K YVg]hY. k k k "Ufhq"i bqk "YXi "Ui #qUa

 $\label{eq:hamiltonian} $$HY'GW.cc``cZhY'5ftg'UbX'AYX]U'kci`X``]_Y'tc'FYgdYWM\cong \cong m5\Lock\`YX[Y'h\Y'HfUX]tjcbU``7i\gtcX]Ubg\cong h\Y'6YXY[U'`fP\Ybg]b[tcb'WJa\di\gt\cong \cong m5\Lock\`YX][U'`fP\Ybg]b[tcb'WJa\di\gt\cong \cong m5\Lock\`Y'B[i\bbUk\U'\dYcd'Y'fbi\gth\'Y'B[i\bbUk\U'\dYcd'Y'fbi\gth\'Y'\UW\\`WJa\di\g'\cong \cong \cong m5\Lock\Y'\UbXg'k\YfY'YUW\\`WJa\di\g'\cong \cong \cong\cong \cong \cong \cong \cong \cong \cong \cong \cong \cong \cong$

7ci fgY 8YHJ] g

7 fYX]hDc]bhg**

Gi a a UfmcZh\Y 7ci fgY

fi `cVU``A YX]U. `A Uf_Yhgž: `ck g`UbX.7 i `hi fYgfiZcW gYg`cb`h\Y`fY`Uh]cbg\]d`VYhk YYb`a YX]U`UbX [`cVU`]gUh]cb"`K Y`k]```YI Ua]bY`h\Y`\]ghcfmcZ]bhYfbUh]cbU``lfUXY`Zck g`]b`Ui X]cj]gi U``[ccXg`UbX`gYfj]WYg UbX`YI d`cfY`\ck 'h\YgY`\Uj Y`V\Ub[YX`h\fci [\`[`cVU``lfYbXg`hck UfX`fY[]cbU`]gUh]cbž`Wci bhYf`Zck `UbX`h\Y]b\WYUg]b[`lfUbgbUh]cbU``dfcXi \W]cb`UbX`X]glf]Vi hJcb`cZa YX]U"`B Yk `mYa Yf[]b[`Zcfa g`cZ\W`hi fY`UbX]XYbh]lmvVugYX`cb`h\Y`YI dYf]Yb\W`cZ\wcga cdc`]h\Db]ga ž`\m\f]X]lm\UbX`X]UgdcfU`k]```VY`YI Ua]bYX`]b`XYhU]``]b fY`Uh]cb`hc`a YX]U`Zcfa g`gi \W`Ug`hY`Yj]g]cb`Zcfa Uhg`UbX`XfUa U`dfc[fUa gžbYhk cf_YX`a YX]UžZ]`a `UbX a i g]\WGh XYbhg`\wca d`Yh]b[`h\]g`\wci fgY`k]``fY\W]j Y`U`h\cfci [\`[fci bX]b[`]b`h\Y`k Uma YX]U`\wcbhf]Vi hY`hc h\Y`]bhYbg]Z]\WJh]cb`cZci f`YI dYf]Yb\W`cZh\Y`k cfX`Ug`U`k \c`Yžk\]\W\k]``dUj Y`h\Y`k UmZcf`Z fh\Yfgh Xm]b]bhYfbUh]cbU``UbX`lfUbgbUh]cbU``a YX]U"

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

- %" ⇒XYbhjZmUbX`Udd`m`_YmWcbW'dhg`UbX`h\Ycf]Yg`k \]W\`YI d`U]b`h\Y`fY`Uhjcbg\]d`VYhk YYb`a YX]U`UbX [`cVU`]qUhjcb
- &" 5 WWci bhiZcf'h\Y'fc`Y'[`cVU`a YX]U'd`Umg`]b'ZcghYf]b['bYk'dUhYfbg'cZWi`hi fY'UbX`]XYbh]Z]WUh]cbž k\]W\'UfY'bc'`cb[Yf'gc`Y`mVUgYX'cb'[Yc[fUd\mž'UbX']b'Xc]b['gc'UddfYW]UhY'X]j Yfg]miUa cb['UbX k]h\]b'W'hi fYq"
- "8]gWiggih\Y`VU`UbWiYVYlk YYb'h\Y'f[i`cVU`fiUbX'h\Y'ficWU`fi]b`X]ZZYfYbh'Zcfa g'cZa YX]U`]b`fY`Uh]cb'hc h\Y`WcbhYl h'cZh\Y]f`dfcXi Wh]cb'UbX'X]ghf]Vi h]cb"
- ("⇒XYbhjZm_YmhfYbXgʻUbXʻdUhhYfbgʻ]bʻh\YʻZck cZUi X]c!j]gi U``[ccXgʻUbXʻgYfj]WYgʻUbX`Yj U`i UhYʻh\Y]a dUWicZUhhYa dhgʻhcʻfY[i `UhY`h\Ya

HYUWX]b[GlfUhY[]Yg

FUh]cbU`Y.

k ci `X``_Y'hc'UddfcUW\'h\YgY'Ug'j Yfma i W\']bWi X]b['Vch\"'5hiha Ygž'ghi XYbhdUfh]W]dUhjcb']b``YWi fYg'k]`` VY'Y`]W]hYX'UbX'k Y'k ci `X``]_Y'ghi XYbhg'hc'ZYY``h\Uhih\]g']g'U`gc'U'gdUW\'k \YfY'h\Ym'WUb'VY'UWhj Y`m]bj c`j YX"

@]_Yk]gYžhi hcf]U`g`k]```VY`WcbXi WhYX`k]h\`g]a]`Uf`[cU`g`]b`a]bX"`5hhYbXUbW\`Uhh\YgY`gYgg]cbg`]g
Wca di `gcfmUbX`ghi XYbhg`a i ghWca Y`dfYdUfYX`UbX`fYUXmhc`dUfh]W]dUhY"`#i]g`UVgc`i hY`mYggYbh]U``h\Uh
h\Ymj]Yk `h\YgY`gYgg]cbg`Ug`U`W\UbW\`hc`j YfVU`]gY`h\Y]f`ck b`i bXYfghUbX]b[`cZh\Y`Wci fgY`UbX`]hg`WcbhYbh
gc`h\Uhh\YmWUb`VYbYZ]hZca `X]gWi gg]b[`UbX`g\Uf]b[`]XYUg`UbX``YUfb]b[`Zfca `h\Y`X]ZZYfYbhdYfgdYWfj Yg`cZ
dYcd`Y`]b`h\Y`fcca "

5XX]h]cbU`'XYhU]`g.

Ei]nnYgʻUbXʻk cf_g\YYhgʻk]``VYʻUj UJʻUV`Yʻ]bʻA ccX`YʻZcf`YUWXʻcZh\Yʻgi VghUbhJUhJʻYʻhcd]Wgʻ]bʻh\YʻWci fgY'' Ghi XYbhgʻg\ci `X`Wca d`YhYʻh\YgYʻ]bʻhJa Yʻk]h\ʻh\Y`XY`]j YfmcZh\Y`Wci fgYʻa UhYfJU`gʻfcbYʻk YY_ʻdYfJcXŁ`Ug h\Ymk]``dfcj]XY`WcbZjfa UhJcbʻcZmci fʻ`YUfb]b[`UbXʻg][b]ZJWUbhmUgg]ghmci `]bʻdYfZcfa]b[`Uhmci fʻVYghcb h\Yʻa cfYʻZcfa U``A]X!hYfa '9I Ua 'UbX`F YgYUfWX`DUdYfʻUggYgga Ybhg''5hh\Y`YbX`cZh\Y`Wci fgYžmci fʻ)\][\Ygha Uf_gʻcbʻh\YgY`k YY_mhUg_gʻk]```VY`Uj YfU[YX`hc`XYhYfa]bY'mci fʻ[fUXY`cbʻh\]gʻUggYgga Ybh'

Gi Va]gg]cb bchYg.Gh XYbhg gi Va]hcb`]bY j]U h\Y A ccX`Y @A G

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

5ggYgga Ybh' . F YgYUfWX DUdYf

GhUfhXUhY. Bch5dd`]WUV`Y

@Yb[h\.'&\$\$\$'k cfXq

8YHJ]`g.

&\$\$\$ k cfXq

Ghi XYbhg fYWY]j Y k f]hhYb ZYYXVUW_]b Hi fb]h]b

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

: i fh\Yf'XYHJ]`g'cZh\]g'Ugg][ba Ybhk]``'VY'dfcj]XYX']b'h\Y'Wti fgY'a ccX`Y'''

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"

5 hm/b XUb VW F Yei]fYa Ybhg

 $\hbox{Ghi XYbhg'UfY'ghfcb[`mYbWci fU[YX'hc'UhhYbX'U```WUggYg'UbX'fYj]Yk ``YWhi fY'fYWcfX]b[g''] }$

7ci fgY'GWXYXi `Y

J]Yk 'WUgg'hja YhUV'Y

H]a YtUV`Y

| 8 UhY | HmdY | 7 cbhYbh |
|--------------------------------|-----------------------------|---|
| K YY_'% '%'>i bY '! ') '>i bY | @YWhifY | I bXYfgHJbX]b[; `cVU`]nUh]cb UbX A YX]U |
| | C b`]bY`5V \f jj]hm | 7 c``UVcfUhY`GYgg]cb`!`+bhfc`hc`h\Y`WUgg/; `cVU`]gUh]cb`UbX`h\Y`A YX]U |
| | | D`YUgY'bchY.'UhhYbXUbWY'Uhh\Y'Wc``UVcfUhY gYgg]cbg']g'bchfYei]fYX'Zcf'gi WWyggZ ``Wca d`Yh]cb cZh\Y'Wci fgY"'K Y'g]a d`mk Ubhhc'[]j Y'mci 'gca Y fYU`'h]a Y'UbX'gdUWY'Zcf'mci 'hc'X]gW ggž[c'cj Yf'UbX Ug_'ei Ygh]cbg'UVci hh\Y'a UhYf]U`'mci 'UfY'VY]b[UggYggYX'cb" |
| | FYUX]b[| 7 ci fgY F YUX]b[|
| | | • : `Yk ž'HYffmf&\$% Ł'"; `cVU`]nUh]cb'H\Ycf]Yg"' +b'A ccX`Y |
| | | |
| | 5ggYgga Ybh | G]a d`Y`k cf_g\YYhei]n`]b`A ccX`Y"`fD`YUgY`bchY`h\Uh U`h\ci [\`h\YfY`UfY`ei]nnYg`Yj Yfmk YY_`mci f`[fUXY Zcf`h\]g`Wca dcbYbh`]g`VUgYX`cb`Ub`Uj YfU[Y`cZmci f)`\][\YghgWcfYg`h\fci [\ci h\h\Y`hYfa" |
| K YY_'&.', '>i bY'!'% >i bY | @YVVni fY | Dc`]h]WU``YWcbca]WUddfcUWXYg'hc'; `cVU`'A YX]U UbX'hXYcf]Yg'cZa YX]U'XYdYbXYbWh |
| | Cb`]bY'5Wfjj]hm | 7 c``UVcfUhY`GYgg]cb`!`Dc`]h]WU``YWcbca mcZf[i`cVU` a YX]Ufi |
| | | D`YUgY'bchY.'UhYbXUbWY'Uhh\Y'Wc``UVcfUhY gYgg]cbg']g'bchfYei]fYX'Zcf'gi WWggZ ``Wca d`Yh]cb cZh\Y'Wci fgY"'K Y'g]a d`mk Ubhhc'[]j Y'mci 'gca Y fYU``h]a Y'UbX'gdUWY'Zcf'mci 'hc'X]gW ggz'[c'cj Yf'UbX Ug_'ei Ygh]cbg'UVci hh\Y'a UhYf]U``mci 'UfY'VY]b[UggYggYX'cb" |
| | FYUX]b[| 7 ci fgY F YUX]b[|
| | | 5flmžž@"7\UdhYf"."HfUbgbUhjcbU`_A YX]U fca '5flmž@"9 'aTS^7` fWdfS[`_ W f? WW[S, 3 5 d[f[US^;` fdaVgUf[a` K YghGi ggYl žl ? ž K]'Ym6`UW_k Y``ž'&\$%) ž'd[g'+%], (" |

| 1 | | |
|-------------------------------|-----------------|---|
| K YY_').'&- '>i bY'!'' '>i `m | @YWn fY | 7 cga cdc`]hUb]ga . '5fY'k Y']bWfYUg]b[`m'W j h]nYbg cZh\Y'k cf`X3' |
| | Cb`]bY'5Wfjj]hm | 7 c``UVcfUhY 'gYgg]cb. '7 cga cdc`]hUb]ga '! 'U'Zcfa 'cZ W'`hi fU`'Y`]h]ga 'cf'Y[U`]hUf]Ub'[`cVU`'W]j]`'gcW]Yhm3 |
| | | D`YUgY`bchY.`UhhYbXUbWY`UhhNY`Wc``UVcfUhY gYgg]cbg`]g`bchfYei]fYX`Zcf`giWWYggZ``Wcad`Yh]cb cZhNY`WcifgY"`KY`g]ad`mkUbhhc`[]jY`mci`gcaY fYU``h]aY`UbX`gdUWY`Zcf`mci`hc`X]gW/ggž`[c`cjYf`UbX |
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| | | gWU`Yž`UbX`k\m3 |
|-----------------------------|----------------------|---|
| | | D`YUgY'bchY. 'UhhYbXUbWY'UhhN,Y'Wc``UVcfUhY gYgg]cbg']g'bchfYei]fYX'Zcf'gi WWggZ `'Wca d`Yh]cb cZh\Y'Wci fgY"'K Y'g]a d`mk Ubhhc'[]j Y'mci 'gca Y fYU``h]a Y'UbX'gdUWY'Zcf'mci 'hc'X]gW ggž'[c'cj Yf'UbX Ug_'ei Ygh]cbg'UVci hh\Y'a UhYf]U`'mci 'UfY'VY]b[UggYggYX'cb" |
| | F YUX]b[| <pre>< Ubg_UžA "'f&\$% Ł"=bhYfbUhJcbU`'ci fbU`]ga 'UbX'h\Y Ya Yf[YbWY'cZhfUbgbUhJcbU`'di V`]Wg. 6Yhk YYb Wcga cdc`]hUb'bcfa gžh\Y'UZJfa UhJcb'cZ]XYbhJhmUbX a Uf_YhZcfWYg"; `cVU``A YX]U'UbX'7 ca a i b]WUhJcb" J "'%(zBc"'%z'%s'!%&%"</pre> |
| | 5ggYgga Ybh | G]a dY'k cf_g\YYhei]n']b'A ccXY"'fD'YUgY'bchY'h\Uh U'h\ci [\'h\YfY'UfY'ei]nnYg'Yj Yfmk YY_'mci f'[fUXY Zcf'h\]g'Wca dcbYbh']g'VUgYX'cb'Ub'Uj YfU[Y'cZmci f)'\][\YghgWcfYg'h\fci [\ci hh\Y'hYfa " |
| K YY_''&+'>i `m'!'' %'>i `m | n@YWhifY | DUfh]WdUhcfmA YX]U`UbX`; `cVU``GcW]U``7\Ub[Y |
| | Cb`]bY`5W]j]hm | 7 c``UVcfUhY 'gYgg]cb'! 'K \Uhifc`Yž']ZUbmžXcYg WcbhYa dcfUfmbYhk cf_YX'a YX]U'd`Um']b'dfca ch]b[[`cVU``gcW]U``WXUb[Y3 D`YUgY 'bchY. 'UhhYbXUbWY'Uhhh\Y'Wc``UVcfUhY gYgg]cbg']g'bchfYei]fYX'Zcf'gi WWYggZ ``Wca d`Yh]cb cZh\Y'Wci fgY'''K Y'g]a d`mk Ubhhc'[]j Y'mci 'gca Y fYU``h]a Y'UbX'gdUWY'Zcf'mci 'hc'X]gWYggZ'[c'cj Yf'UbX |
| | | Ug_rei Ygh]cbgrUVci hih\Yra UhYf]Urmci rUfYrVY]b[UggYggYXrcb" |
| | F YUX]b[| Ug_'ei Ygh]cbg'UVci hh\Y'a UhYf]U`'mci 'UfY'VY]b[|
| | F YUX]b[5ggYgga Ybh | Ug_'ei Ygh]cbg'UVci hh\Y'a UhYf]U`'mci 'UfY'VY]b[UggYggYX'cb" A ccfY!;]`VYfhž'? 'UbX'5Vi `!BUV]ž'N"'fZcfh\Wca]b[Ł "5i h\cf]hUf]Ub'8ck b[fUX]b[ž'fGY`ZkWbgcfg\]d'UbX |
| K YY_'%\$."' '5i [i gh!'+ | | Ug_'ei Ygr]cbg'UVci hth.Y'a UtYf]U`'mci 'UfY'VY]b[UggYggYX'cb" A ccfY!;]'VYfftz'? 'UbX'5Vi `!BUV]z'N"'fZcfth.Wca]b[Ł "5i th.cf]tUf]Ub'8ck b[fUX]b[z'fGY'ZtW'bgcfg\]d'UbX BYk 'A YX]U'5Wfj]ga 'UZYf'th.Y'5fUV'Gdf]b["' . G]a d'Y'k cf_g\YYhei]n']b'A ccX'Y"'fD'YUgY'bctY'th.Uh U'th.ci [\'th.YfY'UfY'ei]nnYg'Yj Yfmk YY_'mci f'[fUXY Zcf'th.]g'Wca dcbYbh]g'VUgYX'cb'Ub'Uj YfU[Y'cZmci f |

F Ygci fWYg

DfYgWf]VYX F Ygci fWYg'

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 Ybhh\fci [\'Hi fb]h]bz'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'''=\mathred{Image: Wa Jhmci f'Ugg][ba YbhXi Y'hc'U'ZJi 'hk]h\'Hi fb]h]b'mci 'a UmUdd'm\mathred{Image: Wa Jhmci f'Ugg][ba YbhXi Y'hc'U'ZJi 'hk]h\'Hi fb]h]b'mci 'a UmUdd'm\mathred{Image: Wa Jhmci f'Ugg][ba YbhXi Y'hc'U'ZJi 'hk]h\'Hi fb]h]b'mci 'a UmUdd'm\mathred{Image: Wa Jhmci f'Ub'Y! hYbg]cb\mathred{Image: Wa Jhmci h\Yf'f'Y'j UbhXcW a Ybhg\mathred{Image: Wa Uj''9! hYfbU''Gi ddcfhmci 'k]'`

JbWi XY'Ug'Yj]XYbW' hc'gi ddcfhmci f'Y! hYbg]cb'Udd']\wUh]cb"'\mathred{Image: Wa Uj''9! hYfbU''Gi ddcfhmci 'k]'`

Ui hca Uh]\wU'`mfYW']j Y'U'h]\w_Yhbi a VYf\mathred{Image: hY'Yd\cbY'mci 'k]\tag{Y}\wu''mug_'\mathred{Image: Wa'\mathred{Image: hY}\wu''mug_'\mathred{Image: hY}\wu''mug_'\mathred{Image: hY}\wu''mug_'\mathred{Image: hY'Yd\cbY''mci 'k]\tag{Y}\wu''mug_'\mathred{Image: hY'\mathred{Image: hY'\mathred{I

; YbYfU``mž'UggYgga YbhiHug_g'a i ghVY'gi Va]hhYX'Y`YVWfcb]\W)``mij]U'Y]h\Yf'Hi fb]h]b'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`hYfbUhjj Y'gi Va]gg]cb'XYHJ]`g''

cfi]bZcfa Uhjcbicbi\ckihcigi Va]hUgg][ba Ybhgicbi]bYij]UiA ccXiY.i\hdg.#gh XYbhi bgk "YXi "Ui #\ck! gi Va]hUgg][ba Ybha ccXiY

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

D`U[]Uf]ga i]gii g]b[ih\Yik cfXgicfi]XYUgicZch\YfgiUbXidfYgYbh]b[ih\Ya iUgimci fick b"i=hWJbihU_Yia Ubm Zcfa gžZfca iXYi]VYfUhYiWXYUh]b[ihciUWW]XYbhU`mWcdm]b[iZfca iUigci fWYik]h\ci hiUW_bck iYX[Ya Ybh'

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



5 WUXYa]W = b Zcfa Uh cb

: cf'YggYbhJU`'gh XYbh']bZcfa UhJcb'fY`UhJb['hc.

- fYei Yghg 'Zcf'Yl hYbg]cb/
- `UhY`gi Va]gg]cbg`[i]XY`]bYg/
- fYi]Yk 'cZa Uf_g/
- I BGK '< YU'h\ 'UbX'GUZYhm'dc`]\\\Yg/
- YI Ua]bUh]cb dfcWYXi fYg/
- qdYWJU``Wcbq]XYfUHjcb`]b`H\Y`Yj YbhcZ]``bYgg`cf`a]gUXj Ybh fY/
- gh XYbhYei]miUbX'X]qUV]`]m/
- UbX'ch\Yf'YggYbhJU`'UWUXYa]W]bZcfa UhJcbz'gYY

\hdg.#k k k "Ufhg"i bgk "YXi "Ui #W ffYbhgh XYbhg#UWJXYa]W]bZcfa Uh]cb#dfchcWc`g![i]XY`]bYg#

.

⇒a U[Y'7fYX]h

D\chc'Vm'A UfWc'Ncdd]'cb'l bad'Uq\

7F = 7CG

7F = 7CG Dfc|]XYf 7cXY. \$\$\$-,;

5W_bck `YX[Ya YbhcZ7ci bhfm

 $K Y : UW\underline{b} ck `YX[Y : h, Y : 6YXY[U : dY cd `Y : k \ c : UfY : h, Y : hfUX]h\underline{b} cb : `W ghcX]Ubg : cZh, Y ``UbXg : cb : k \]WX : I B G K ? Ybg]b[hcb : WUa di g :]g ``cWUhYX''$