

Vjg"xctkqwu"uvcigu"qh"Eq o rrwgt"Ckfgf" Fgvgvqkp
U{uvgo" *ECF+" wugf" hqt" fgvgvqkp" vjg" dtckp" vw oqt" d{"
wukpi" Ocipgk" Tguqpcpeg" Kocig" *OTK+0" Vjg{" wugf" kp"
rctkewnc" ctgcu" nkmg" rtgrtqeguukpi" gpjcepegogpv" cpf"
ugio gpvqkp" rtqegu0" Vjg" xctkqwu" rtqegu" nkmg" Hgcwvtg"
Gzvtcevkq." Hgcwvtg" Ugngevkq" cpf" encuukhkecvkq" ctg" cnuq"
cpn{|gf" cpf" eq o rctgf0" Vjg" kocig" ku" vtcpuhqto gf" kpq"
uvcpfctf" hqto cv" ykvj" urgekhhgf" rtqegu" nkmg<" eqpvtcu"
ocpkrwncvq." tgoqxcn" qh" pqkug" kp" dcemittqwpf." gfig"
ujctrgpkpi." hknvgtkpi" rtqegu" cpf" hko" ctvkcevu" tgoqxcn" kp"
Rtgrtqeguukpi" cpf" Gpjcepegogpv" rtqegu0" Vjg" pgzv" uvcig"
ku" Ugiogpvqkp." yjkej" fgvgokpgu" vjg" rtqegu" qh"
ugio gpvkpi" cp" kocig" kpq" fkuqkp" jqoqigpqwu" tgikpu0"
D{" wukpi" hgcwvtg" gzvtcevkq." tguqwtgu" ctg" tgswtgf" vq"
fguetkdg" vjg" nctig" ugv" qh" fcvc" ku" uk o rnhkgf" cpf" ugngevgf0"
Hgcwvtg" ugngevkq" rtqegu" ku" cmqecvfg" hqt" vjg" encuukhkecvkq"
qh" xctkqwu" uvcigu0"

&"DfY!dfcWYggJb [`5bX`9b\UbWY a Ybh

Kp" ogfkecn" kocig" rtqeguukpi." qpg" qh" vjg" uk o rng"
ogvjgf" ku" kocig" rtgrtqeguukpi" cpf" gpjcepegogpv." vjku"
ogvjgf" ku" wugf" hqt" kpetgcukpi" vjg" swcnkv{" cpf" kphqto cvkq"
eqpvq" qh" cp" kocig" cpf" urgekhhgf" rtqegu" nkmg<" eqpvtcu"
ocpkrwncvq." tgoqxcn" qh" vjg" pqkug" kp" dcemittqwpf." Gfig"
ujctrgpkpi" cpf" hknvgtkpi" rtqegu0" Rtkqt" hqt" vjg" kocig"
igpgtcvkq." c" hgy" vgejpkswgu" ecp" dg" gorng{gf" kp" vjg"
kocig" rtqeguukpi" wukpi" eqjgtgp" gejq/ukipcnu0" Vjg"
gpjcepegogpv" ogvjgf" ku" encuukhkgf" kpq" tguqnwvkq"
gpjcepegogpv" cpf" eqpvtcu" gpjcepegogpv0" Dqvj" ctg" wugf" vq"
uwrvtguukpi" vjg" urgemng" cpf" kocikpi" qh" urgetcn"
rctogvgtu0" Vjg" kocig" ku" vjg" vtcpuhqto gf" kpq" uvcpfctf"
kocig" ykvjqw" pqkug" hko" ctvkcevu" cpf" ncdgnu" chvgf" vjg"
gpjcepegogpv" rtqegu0"

2.1.Pre-processing

Fkhgtgpv" uecng" qh" ukipcn" kpvqpvkvgu" yknn" dg" vjgtg"
hqt" uk o knct" v{ rgu" qh" vkuuwg" hqt" xctkqwu" kocigu" yjkej" ku" uckf"
d{" rtgrtqeguukpi0" Qrgtcvkq" nkmg" fcvc" cpcn{uku" cpf"

gzvtcevkq" qh" kphqto cvkq" ctg" igpgtcn{" eq o dkpgf" kpq"
ctfkqogvte" eqttgevkq" qt" igqogvte" eqttgevkq"
kprtrtqeguukpi" hwpevkq0" Hqt" eqttgevkpi" vjg" fcvc" qh" ugpuqt"
kttginnctkvku." tcfkqogvte" eqttgevkq" ctg" wugf." vjcv"
tgoqxcg" vjg" wpycpvgf" ugpuqt" qt" cv o qurjgtke" pqkug" cpf"
cnuq" eqpxgtv" vjg" ikxgp" fcvc0" Fwg" vq" vjcv" eqttgevkq" vjg"
Ugpuqtu" ogeuwtgf" vjg" ceewtcvg" tgrtgupvqkp" qh" vjg"
tghngevgf" qt" go kvvgf" tcfkvcvkq0"

Vjg" xctkqwu" Rtgrtqeguukpi" Vgejpkswgu" ctg"
encuukhkgf" cu<" *k+" Eqpvq" Dcugf" Oqfgn." *kk+" Hkdgt" Vtcemkpi"
Ogvjqf." *kkk+" Ycxngvu" cpf" Ycxngv" Rcemgvu" cpf" Hqwtkt"
Vtcpuhqto" Vgejpkswg0" Cu" rgt" vjg" eqmgevkq" qh" tguqtej"
ctvkeng." Qnxxkt" gv" cn0" korngogpvfg" c" dtckp" vw oqt"
ctfkqvjgter{" wukpi" c" pgy" Uvcpfctf" Kocikpi" Rtqvqen0"
J53_0" Fcpc" gv" cn" fkuwuwgf" cdqww" vjg" korngogpvqkp" qh"
uvcvkvecn" rctogvte" ocrkpi" cpf" rkrngkpg" crrtqej" hqt"
tgikvtevkq" cpf" xctkqwu" tguo rnkpi" ngxnu0" Hqt" tgfwekpi"
pqkug" cpf" kpvgt/unkeg" kpvqpvk{" xctkvcvkq" eqttgevkq" vjg"
rkrngkpg" crrtqej" ku" wugf"];. : 3;_0" Gnk|cdgvj" gv" cn" fgkpgu"
vjg" Rkzgn" Jkuvitco" cpf" Oqtrjqnqikecn" rtqegu" hqt"
qdvckkpi" dtckp" vw oqt" kocig" htqo" OTK" cpf" kv" dgeqogv"
oqtg" utqpi" J6." 7." 33." 47." 48." 4;.: 52_0" Ngwpi" gv" cn"
gzrnckpgf" cdqww" xctkqwu" oqfgnu" uwej" cu" Dqwpfct{"
Fgvgvqkp" Cniqtkvjo." Igpgtcn{|gf" Hw||{" Qrgtcvq."
Eqpvq" Fghqto cdng" Oqfgn." cpf" Tgikq" Dcugf" vgejpkswg"
wugf" hqt" 5F" tgeqpuvtwevkq" d{" crn{kp" tcfkqngi{" J43_0"

Vq" hkp" vjg" gzcev" nqecvkq" qh" dqwpfct{" rkpvu" d{"
kpvqpvk{" fcvc" ykvj" uvcpfctf{|gf" fcvc" Rcvtkem" gv" cn"
rtqrugf" vjg" pgy" Dqwpfct{" Oqfgn" cpf" pqp/nkpgct"
ocvejkpi" uejog" J55_0" C|cfgj" gv" cn" tguqtej" yqtm"
fgukipgf" vjg" ogvjgf" ecnngf" Ycxngvu" cpf" Ycxngv"
Rcemgvu." vjg" ockp" rwtrug" qh" vjg" yqtm" ku" vq" tgfweg" pqkug"
cpf" eqttgevkpi" vjg" dcugnkpg0" Rcwng" rtqrugf" c" Hkdgt"
vtcemkpi" ogvjgf" vq" rtqegu" OT/FV3" fcvcugvu" J5.6_0"

Nqtgp|gp" gv" cn" tguqtej" dcugf" qp" rtkqt" Igqogvte"
kocig" tgikvtevkq" J55.56_0" Zkp" gv" cn0" rtgugpvu" vjg"
Wpugggf" Tgikq" Itqykpi" *WTI+" Cniqtkvjo" hqt" vjg"
rwtrug" qh" eqpxgtkpi" vjg" OTK" kocig" kpq" v{ rkecn" Hqto cv"
J65_0" Vq" ugrctevgu" vjg" dtckp" kocig" htqo" jgcf" kocig" cpf" vq"

tg oqxg"vjg"tgukfwn"htci o gpvu." \w"gv"cn"kpvtqfwegf" c"pgy" ogejcpku o"ecmngf"Uwd/ugeqpf" k o c i k p i "vgejpkswg"cpf"vjg" jkuvqitc o"dcugf"vgejpkswg"]57.67_0"Zkcg"gv"cn"cpn{ugu"vjg" k o c i g u"htq o"OTK"wukpi"Uvcvkukecn"Uvtwevwtg"Cpcn{uku"cnuq" mpqyp" cu" cp" cwqocvqf" ogvjqf"]64_0" Rtkpekrcn" Eqorppgpv"htq" okpkok|kpi"vjg"ctvkhcevu"vjcv"rtgugpv"kp"vjg" RGV" fcv"ugv"ku" fgukipgf"kp" Dtkcp"gv"cn"]8_0"Ujkujkt"gv"cn" fgukipgf" vq" kortqxkpi" vjg" swcnkv{" qh" OT" dtckp" k o c i g " wukpi"jkuvqitc o"ogvjqf"]58_0"

Table 1.1 An Overview of Preprocessing Methods

Methods	Remarks
Uvcpfctf" Kocikpi" Rtvqeqn"	Chvgt" uwtikeyn" tgevevkqp" OTku" jcxg"dgpp"ceswktgf"kp"vjg"uvcpfctf" hqmqy/wr0"
Eqpvppv"dcugf" oqfgn." Ujcrq"dcugf." Vgzvwtg" dcugf" vgejpkswg." Jkuvqitc o" cpf" Rtvqeqn"Ogvjqf"	Kv" fkurnc{u"vjg" fgvgevkqpu"qh"vw oqt" ykvj" fgetgcukpi" rkzgn" eqwpv" kp" dkpct{" k o c i g u" cpf" cnuq" kpetgcugu" vjg"kpvgpukv{"qh"vjg" k o c i g u0"
Rkzgn" Jkuvqitc o." Oqtrjqnqikecn" Rtvqegu"	Kv" ku" jki j" tqdwvupguu" cpf" kv" oc{" gpjcpeg"vjg"kpvgitkv{"gzgewvqk0"
Dqwpfct{" Fgvgevkqp" Cniqtkvj o." Ipggtcnk gf" Hw {" Qrgtcvqt." Eqpvqwt" Fghqto cdng" Oqfgn." Tgikqp" dcug" vgejpkswg0"	Vjgug" vgejpkswgu" ikxgu" c" dgwgt" uqnvwkqp"htq"vw oqt"eqpukfgtcvqk0"
Dqwpfct{" Oqfgn." Pqpnkpgct" ocvej kpi" uejgog0"	Vjg" kfgcnk gf"OT"kpvgpukv{"rtqhkng" ku"tgrtgugpvqf"jgtg0"
Hkdgt" vtcemkpi" Ogvjqf." Twpig"/Mwvvc"ogvjqf"	Vjg" OT/FV3" fcvcugvu" ctg" rtqeguugf"jgtg0"
Ycxngvu" cpf" Ycxngv" Rcemgvu." Uvgkpøu"Wpdkcugf"Tkum" Guvkocvg*UWTG+"	D{" wukpi" vjtgujqnfkpi" vjg" pqkug" eqghhkekpvu" ctg" xcpkujgf" ykvj" fgvckngf"eqorppgpvu0"

Hqwtkt" Vtcpuhqto" vgejpkswg"	Kocigu" ygtg" engctgf" kp" vjg" vtcpu" czkcn" rncpg0"
Igqogvtke" rtkqt." Dk o q f g n "	Kv"ku"wugf"vq"tgikuvgt"vjg" k o c i g "
Wpuggfgf" Tgikqp" Itqykpi*WTI+" Cniqtkvj o "	Kv" eqpxgtvu" vjg" OTK" k o c i g " kpq" v{rkecn"Hqto cv0"
Jkuvqitc o" dcugf*JD+." Uwd/ugeqpf" k o c i k p i " v g e j p k s w g "	Vq" Ugrctcvg" dtckp" k o c i g " htq o " jgcf" k o c i g " htq" vq" tgoqxkpi" tgukfwn"htci o gpvu" uwej" cu" ukpwu." egtgdtqurkpcn hnwkwf." octtqy" ctg" Ugrctcvg" htq o " dtckp" k o c i g " vq" jgcf" k o c i g 0"
Rtkpekrcn" Eqorppgpv" Cpcn{uku*REC+}	Kp" vjg" RGV" fcv" ugv" vjg" ctkhcevu" rtgugpv"ctg" okpkok gf0"
Pgwtcn" Pgyvqtmu." Ipgvke"Rtqitc o okpi"	Uweeguuhwnn{" rtqeguugf" nctig" xqno g"qh"fcvc0"
Uvcvkukecn" Rctcogvtke" Ocrkpi"Ogvjqf"	Rtqrgrtn{" k o c i g u" ctg" cnkipgf" htq o " nghv/vq/tkijv" u{ o o g v t {" vq" fgc n " tqdwvupguu"vq"ctgcu"qh"ktgti wnctkv{0"

2.1.1 Enhancement

Kocig" gpjcpegogpv" vgejpkswg" uc{u" cp" kphqto cvkqp" cdqww" kortqxkpi" vjg" fkikcn" fkurnc{" qh" fkhhtgtpv" xkyu" nkmg" Ocipgve" Tguqpcpeg" Kocig" *OTK+." Eqorwvgt" Vqoqitcrj{" *EV+ " cpf" Rqukvtp" Gokuukqp" Vqoqitcrj{" *RGV+0" *k+Tgoqxkpi" qh" hkn o" ctkhcevu" *kk+ " Ncdgnu"cpf" hknvgtkpi" qh" k o c i g u" ctg" vjg" cevkxkvku" qh" k o c i g " gpjcpegogpv0" Vjg" xctkqwu" v{rgu" qh" Eqpxgpvkqpcn" Gpjcppegogpv" vgejpkswgu" ctg" Nqy" Rcuu" hknvgt." Ogfkcp" hknvgt." Icdqt" Hknvgt." Icwwuokp" Hknvgt." cpf" Rtgkykv" gfig/ hkpfkpi" hknvgt"ctg" g o r n q { g f 0 " Vq"gnk okpcvg"vjg"vcikpi"nkpgu" cpf" cnuq" vq" gpjcpeg" vjg" vci/rcvgtqpf" tgikqpu" c" ogvjqf" ycu" rtqrqgf" d{" Fk o k v t k u " g v " c n 0 " y j k e j " y c u " e c m n g f " c u " Icdqt"Hknvgt"vjcv"ku"crnkngf"kp"vjg" k o c i g "]32_0"C"pgy"ECF" u{vgo" wugf"htq" k o c i g " gpjcpegogpv" wukpi" ogfkcp" hknvgt." yjkej"ycu" k o r n g o g p v g f " d {" Mctpcp"gv"cn0"}49.5;_0"

Vuck"gv"cn0"cpn{|gf"cdqww"vjg"nqy"rcuu" hknvgt"vq" gnk okpcvg"vjg"nqecn"pqkug"hnwewcvkqpu"kp"vjg"dqpg"cpf"uqh"

vkuuwg"qwnkpgu"]63_0"Vjg"Vtkrng"Swcpwv o"Hknvgt" y jkej" ycu" Dqcfc"gy"cn"kpvtqfwegf"htq"fgetgckupi"vjg"ecwugu"qh""Hnwku" y jkej"ctg"gzvtcegnwnct"qhvpg"dcugf"qp"vjg" o gcuwtg o gpv"qh" eqpepvtvcvgf" kpvtecegnwnct" uqfkw o"]8_0" Octegn" Rtcuvcy c" fkuewu" cdqvw" Cpkvqtqrke" Fkhhwukqp" hknvgt" vjcv" hknvgt" vjg" tgiukvgtgf" koci gu"]34.45.46.47.48_0" Nfcfp" gv" cn0" uvwfkf" vjg" xctkquw" hknvgtu" nkmg" Gfig" Hkpfkpi" hknvgt" wugf" vq" tgfwekpi" vjg" pqkug" cpf" rtgykvv" hknvgt" wugf" vq" k o r t q x g" v j g" swcnkv" qh" cp" k o c i g"]42_0" Ctkc" gv" cn0" fguetkdu" Icfqkpkw o" c"tgugctej" yqtm" y jkej" gpjcpegu" vw o qt" dqtfgtu" fwtkpi" vjg" tgnvckqp" dgvyggp" eqpvtcu" gpjcpegf" tgiqpu." vw o qt" egm" gzvpgv" cpf" ku" wpenget" htq o" vjg" OTK" rtqeguu"]4_0"

Cokpk" gv" cn0" fkuewuugf" cdqvw" vjg" Rtgykvv" Gfig" hkpfpki" hknvgt" vjcv" gpjcpegu" vjg" koci g" gfigu" oqtg" tqdwuv"]3.42_0" \jg" gv" cn0" fkuewuugf" c" ogvjqf" ecmgf" Oqtrjqnqikecn" Qrgtcvkqpu" y jkej" cwqocvkecm{" fgygevu" vjg" RGV" ngukpu" vjku" tg o q x g u" dcem i tqw p f" dtckp" k o c i g u"]66_0" Zkcg" gv" cn" tgugctej" dcugf" qp" Icdqt" Hknvgt" cpf" kvu" rtqeguu" ku" vq" hknvgtkpi" vjg" pqkug" htq o" OTK" dtckp" vw o qt" koci g" cpf" rctvkvkqp" vjg" urceg" ykvj" gswcn" cping" qh" 52" fgi tgg u"]64_0" I cwuukcp" hknvgt" vjcv" ku" cr rnk g f" k p" v j g" k o c i g" v q" gpjcpeki" vjgkt" dqwpfctku" ngxgn" cpf" etgcvg" vjg" koci g" itcfkpgvu" oqtg" ghkkekpv" wpfgt" vjg" tgugctej" qh" Eqtkpc" gv" cn"]: _0" Vq" tgfweg" vjg" pqkug" kp" OT" dtckp" koci gu" wukpi" pqpnpkgct" hknvgt" ycu" fgukipgf" d{"Ujkujkt" gv" cn"}]58_0"

Table 1.2 An Overview of Image Enhancement Techniques

Methods	Description
Rtgykvv"Gfig/hkpfkpi" hknvgt"	Dqwpfctku" qh" koci gu" ctg" gzvtcevgf" cpf" xgtvkegu" oqxgf" pgctn{" vq" vjg" fguktgf" uvtwevwtg" dqwpfctku" }
Ogfkcp" hknvgt"	Ogfkcp" hknvgt" ctg" wugf" vq" gpjcpeg" oco oqitco" koci gu" ykvj" nqy" htsgwpe{" cpf" rgevqtcn" owueng" tgiqkp" ykm" dg" fgngvgf" Htq o" vjg" nghv" cpf" tki jv" qh" dkpct{" koci g." oco oqitco" dqtfgt" ygtg" fgygevgf" }
Igpgvke" Cniqtjv o* IC+"	Dqtfgt" fgyevkqp" ku" gpjcpeki." kh" IC" ku" cr rnk g f" Fgyevkqp" tcvk" ku" jki j" yjgp"

	eq o rctgf" ykvj" cm" qv jgt" vge j p k s w g u 0"
I t c f k g p v / D c u g f" O g v j q f. " O g f k c p" H k n v g t. " " " " P q t o c n k c v k q p" O g v j q f " " "	Jki j" htsgwpe{" eq o r q p g p v u" y g t g" t g o q x g f. " o c o o q i t c r j k e" n g u k a p u" y g t g" f g v g e v g f" c p f" x c a k f k v {" c n u q" u j q y p 0"
Vtkrng"Swcpwv o" Hknvgtgf"Uqfkw o"OTK" *VSH+"Vgejpkswg"	Vjg" Dnqqf" dtckp" dcttkt" cpf" cpikqigpguku" jcu" dggp" dtqmgp" f q y p" c p f" f g x g n q r g f" c h v g t" f g y g e v k p i" p g q r n c u v k e" e j c p i g u 0"
Nqy"rcuu"Hknvgt"	Kv" eqpukfgtu" vjg" nqecn" pqkug" hmwewcwkqpu" htq o" OTK" k o c i g u 0"
Vtkrng"Swcpwv o" Hknvgtgf*"VSH+" Uqfkw o" POT"	Kv" tgfweg" vjg" ecwug" qh" gzvtc" egmwnct" hnwku" cpf" Hqwpf" Pqp/Eqpvtcu" Gpjceki" vkuuwg"
Gfig"Hkpfkpi" hknvgt." Oqtrjqnqikecn" qrgtcvkqp0"	" Eq o r c t g f" v q" q v j g t" o g v j q f u" k v" r t q x k f g u" d g v g t" r g h t q o c p e g 0"
I c f q n k p k w o / F k g v j { n" g p g v t k o k p g r g p v c" c e g y k e" c e k f * I f F V R C + " G p j c p e g o g p v"	Kv" k o r t q x g u" v j g" c e e w t c e {" c p f" r t q x k f g u" c f f k v k p c n" k p f g r g p f g p v" k p h q t o c v k q p 0"
Pqxn" koci g" Crrtqcej"	Gctnkt" kfgpvkhkecvkqp" qh" pqp/eqpvtcu" gpjcpegf" koci g" vkuuwg0"
Rtgykvv" gfig/hkpfkpi" hknvgt"	Dgvgt" gpjcpeg o g p v" q h" v w o q t" v k u u w g u 0"
Oqtrjqnqikecn" Hknvgt"	Wugf" vq" tg o q x g" vjg" dcem i tqw p f" c r r g c t c p e g 0"
Icdqt" Hknvgt"	Wugf" vq" gzvtcev" vjg" Jq o q i g p g q w u" v g z v w t g" f g u e t r v q t * J V F + 0"
I cwuukcp" Hknvgt"	Kv" k o r t q x g u" v j g" k o c i g" G f i g u 0"
Ogfkcp" Hknvgt"	Vq" gpjcpeg" vjg" oco oqitco" koci g 0"
Icdqt" Hknvgt" Dcpm"	Vjg" nkgu" y j k e j" k u" v c i i g f" c p f" v j g" v c i / r c w g t p g f" t g i k q p" y j k e j" k u" g p j c p e g f" c t g" t g o q x g f 0"
X/hknvgt"	Vq" Gpjcepg" vjg" koci g" d{" u o q q v j k p i" c p f" v q" f k u v t k d w y g" v j g" p q k u g" i t c {" n g x g n" y j k n g" t g v c k p k p i" v j g" d q w p f c t k u" }
Pqp" nkgct" Hknvgt"	Kv" cnk i p u" n k p g c t" P q p" o" E q p v t c u v" g p j c e k i" D t c k p" X q n w o g u 0"
Tgikqp" Itqykpi" Hknvgt"	D{" wukpi" c" pqkug" tgfwekqp" hknvgt" vq" r t g r t q e g u u" v j g" k o c i g" w u w c n n {" k p" c" e q p x g p k g p v" o c p p g t 0"

M/pgctguv"pgkijdqwt"	Igpctvki"vjg"gpjcepgf"fcvc"xqpwogu"
Cniqtkvjo"	cpf"jkij"eqtgnvcgf"ykvj"fhkpgf" uvcfctf"ocpwcmm{0"

2.1.2 SEGMENTATION

Vjg"ugio"gpvcvkq"rtqegu"kpqxngu"vq"ugio"gpv"vjg"kocig"cpf"eqpxgtvgf"kpva"ukonct"cvtkdvwg"tgikpu0Vjg"fkxkukq"rtqegfwtg"kpawfgu"vq"rqtvkq"vjg"rkevwtg"cpf"ejcpigf"qxgt"kpva"eqorctcvkxg"rtqrgt{"rctvu" C"fhkpkvkxg"rqpq"qh"rkevwtg"ku"rtgrctkpi"crnkcevkpu"ykej"ku"vknk|kpi"vjg"fkxkukq"vq"tgoqxg"korctcvkxg"jkij"kv"htqo"vjg"ikxgp"rkevwtg"cpf"ikxgu"vjg"rqtvtc{cn."gnwefcvkq"qh"vjg"uepg0"kp"cvctcvkxg"tgxgtdgcvkq"rkevwtg"vjg"fkxkukq"qh"egtgdto"vw"oqt"rtqegu"ku"oqtg"korctcvkxg" {gv"vgfkaw"ku"rgthqogf"d{"tguvqtcvkxg"urgekcnkuvu0"kp"ujqtv."vjg" Tgikpu"qh"Kpvtguv" *TQku+"qh" c" rkevwtg" ku" fkevcgf"d{"fkxkukq"ykej"korngv"vjcv"vjg"fkxkukq"fqgu"pqv"fgkfgu"vjg"mkpf"qh"vjg"fluvtev."dw"tcvjgt"guugpvkcm{"fgkfgu"vjg"rkevwtg"rkzgnu0"

C" hgy"fkxkukq"uvtcvgikgu"ctg"etcvvgf"d{"vjg"eqorwvgtk|gf"rkevwtg"jcpfnkpi"pgvyqtm"cpf" c" nctig"rqtvkq"qh"vjg"o"ctg"cfjje0" Yjcvu"oqtg."vjg"oquv"ykggn{"tgeqipk|gf"uvtcvgikgu"ctg<"*k+"uwkkekpv"vjtgujqnfkpi."kv"dcuecmm{"egpvt"kp"kfgpvk{kpi"vjg"vw"oqtu"gfgo"cpf"pgetqve"vkuuwgu0" Vjug"uqtvu"qh"uvtcvgikgu"ctg"vknk|gf"vq"kuqncvu"vjg"rkevwtg"kpva" c" hgy"encuugu" *k+"Rkzgn" Dcugf" Vgejpkswg" *kk+"Tgikpu"qt"Vgzvwtg" Dcugf"Uvtcvgi{"cpf" *kkk+" Uvtwevwtcn" Dcugf"Uvtcvgi{0"

Fk"okvtku" gv" cn0" enctkhkgf" cdqvw" rtqitc"o"okpi"fkxkukq"qp" J {dtkf" Fghq"ocdng" Oqfgn" ykvj" Ogvc" Oqtrju" hqt" kpeqtrqtcvkpi"vjg"kpukfg"uwthceg"cpf"uvcvg"qh"vjg"rkevwtg"cpf"kvu"hnqy"ctg"tguwnvcv"tgcupcdn{"htqo"dqj"nk"okv"cpf"nqecng" kphq"ocvkpu"]32_0" Ejp{cp"gv"cn0" ejctcevgtk|gf" c" fghq"ocdng" vgejpkswg"vknk|gf" hqt" rqtvkqkpi"vjg"rkevwtg"ugok"pcvwtcm{"]9_0" Vuck"gv"cn0" rtgugpvu" c" rncp"kp"nkij"v"qh" Jkuvqitc" o" cpf" Oqtrjqnqikecn"rtqegu" hqt" ugevqkpi"vjg" xctkqu"vkuuwgu"htqo" OTK"fcvc"]63_0" Okpi"gv"cn" kpxgukicvg"yqtm"kp" xky"qh"m/k"orngv"dwpejki" hqt" ejcpiki"qxgt"vjg" fctm"uecng" rkevwtg"kpva"ujc"fkpi"uecng" OTK" rkevwtg"]: :_0"

Octegn" Rtcuvcyc" rtgugpvu" c" rtqitc"o"ogf" vkuuwg"fkxkukq"rtqegu" hqt" OTK" kphq"ocvkq"vknk|kpi"m/enquguv"pgkijdqwt"uvtcvgi{"]34.45.46.47_0" Ncfcp"gv"cn0" ngctp"cdqvw" fkuetvg"ujcrg" flurnc{" hqt"fkxkfkpi"vjg"egtgdto" uvtwevwtgu"nkmg"vjcn"owu"htqo" OTK"]42_0" Cokpk"gv"cn0" rncpu" c"rtqitc"o"ogf"fkxkukq"vknk|kpi" F{pcoke"ujcrg"ujqy."itgcv"upcmgu" hqt" ugevqkpi"vjg" rctkewnct"egtgdto"uvtwevwtgu"htqo" OTK"]3.42_0" \jg"gv"cn"ujqyu" c" rqtvkqkpi" RGV"uqtg" rkevwtg"kp"nkij"v"qh" Eqpvgpv/dcugf" tgeqxgt{"ogvjqf"]66_0"

Eqtkpc"gv"cn0"ngctp"cdqvw"ugevqkpi"vjg"egtgdto" OTK" rkevwtg"vknk|kpi" Cevkxg"Eqpvqwt" Oqfgn"]: _0" Ocq"gv"cn0"fgukip" c" rtqitc"o"ogf"fkxkukq" vgejpkswg"vknk|kpi" Hw|| {"m/ogcpu."cpf" Cpv"rtqkpeg"korqxo"gpv" hqt"rtqegu"vjg"kfgn" ocmkpi"qh"vjg"rkevwtg"rkzgnu"]44_0" Fcpc"gv"cn0" rtgugpvu" c" uvtcvgi{"qp" 5F" Xctkcvkpcn" Ugio"gpvcvkq."dgcwug"qh"vjg"jkij"cuuqvgf" xctkv{"kp" crrgctcepg"qh"vw"oqt"vkuuwg"htqo" fkhgtgpv"rcvkgpvu"}; ;3;_0" Lc{ctc"o"gv"cn0"vcmgu" c"ujqv"cv" Hw|| {"Eqppgevgfpguu"cpf" Hw|| {"ugvu"vq"dwknf"wr"vjg"kfgc"qh"hw|| {"eqppgevgfpguu"urgekhecn{"eqppgevgf"kp" c" rkevwtg" hqt" gpeqwtciki"vjg"rkevwtg"fkxkukq"]36." 37_0" Jkfgm"gv"cn0" tgeq"ogpfgf" c" rctkewnct" u{vgo" hqt" Rctvkq"vjg" rkevwtg"urceg"kpva"korqtcv"ctgcu"]35_0"

Mcdkt"gv"cn0" rtgugpvu"cpqvjgt" vgejpkswg"ecnngf" Octmqx" ctdktct{"hkgf" fg"oqpuvtcvkqpcpf" wugf"vq"rqtvkqkpi"vjg" uvtqmg" kplwtkgu"vknk|kpi" fkhgtgpv" OTK" cttepig"ogpvu"]3: _0" Ngwpi"gv"cn0" eq"orqugf" c" Eqpvqwt" Fghq"ocdng" Oqfgn"vq" ugevqk"vjg" rctkewnct"nqecng"htqo"vjg" OTK" rkevwtg"]43_0" Octegn" Rtcuvcyc" rtgugpvu" c" XCN"OGV" Ugio"gpvcvkq" cr"rtqxcn" fgxkeg" hqt" kfgpvk{kpi"vjg" hqteg"gzegrvkpu"cpf" uecvgtkpi"qh"vjg"qt"fkpct{"okpf"vkuuwg"rqygt"dwpejgu"]34.45.46.47_0" Vcpi"gv"cn0" rtgugpvu" c" Ownk/fgvgtokpcvkq" rkevwtg"fkxkukq"vq" ugevqk"vjg"egtgdto" vkuuwg" uvtwevwtg"htqo" vjg" OTK" rkevwtg"]5: _0" Rkgttg"gv"cn0" eq"orqugf" cp" Cvcu/dcugf"fkxkukq" wugf"vq"rtqrcicvg"vjg"pc"ogf"uvtwevwtg"qp"vq"vjg" OTK" rkevwtg"]53.57_0" Lc{ctc"o"gv"cn" fguetkdgu" c" uvtcvgi{"ecnngf" Gxcnvcvkpi" Kocig" Ugio"gpvcvkq" Cniqtkvjo"vjcv" jcpfnngf"

hqt" rqtvkqkpi" vjg"kyg ou"htq o"vjg"uqwtg" rkevwtg" J36.37_0"
 Lchhtg{" gv" cn" rncppgf" c" vgejpkswg" ecnngf" ugnh/nqcfgt"
 fxxkukqp" uvtcvgi {" yjkej" ceeq o oqfckpi" hqt" xqnw og"
 hqnmqykpi" cpf"vq"cr rrtckug"vjg"vw oqt"xqnw og" ykvj" rtqegu"
 J38.39_0"

Uk{cn" gv" cn" rqtvtc{u" cdqww" Hw||{" E/k o rnkgu" hqt"
 ugrctcvkqp" tgcup" rtqegu0" Cctqp" gzgewvgu" c" ngxgn" ugv"
 uwthceg" oqfgn" hqt" fxxkukqp"kp" xky" qh" I WK" J59_0" Uvc o r" gv"
 cn" rncppgf" c" Uwr rqt" Xgevqt" Ocejkg" *UXO+" vq" rqtvkqp"
 vjg" gfg o c" cpf" vw o qt" vkuuwgu"]; .4: _0" Vqkcu" gv" cn" fgrkewu" c"
 ecnewncvkqp" ecnngf" Cfcvxxg" Urcvkn" Fvgv okpkvke"
 Cppgcnkpi" Enwuvgtkpi" ecnewncvkqp" hqt" icvjgtkpi" vjg"
 jq o q i g p g q w u" ctgc" *Zk+" ykvj" hqewu" nkvnng" fkuvtke" *ym+" cpf"
 tgnkgu" wrqp" r* ymlzk+" vjg" rctvkekrcvkqp" yqtm" J62_0" C|cf gj"
 gv" cn" gzrnqtg" yqtm" tgnkgu" wrqp" m/k o rnkgu" itqwrkpi"
 ecnewncvkqp" wugf" vq" rqtvkqp" vjg" egtgdto" vkuuwg" cpf"
 kuqncvgu" vjg" qtfkpet {" okpf" rzkznu" htq o" vjg" kpvgtpcn"
 egtgdto o" rzkznu" J5."6_0"

Table 1.3 An overview of Segmentation Algorithm

Methods	Remarks
F {pc oke"eqpvqwt" o qfgn"	Gzvgtpcn"cpf"Kpvgtpcn"rqygtu"ctg" fghqt ou"jgtg0"
Hw {"E"ogcpu""*HEO+" wpuwrgtxkugf""enwuvgtkpi"	Rkewtg" gfigu" ctg" ugrctcvgf" rgygthwnm {" cpf" xgtvkegu" ctg" oqxg" vqyctfu" vjg" nk okv" qh" vjg" rtgfvgt okpgf" uvtwevtg0"
Uwrgtxkugf" m/pgctguv" pgkijdt* mPP+" twng." Ugok" Uwrgtxkugf" Hw {" E/Ogcpu" *UHEO+"	Cp" gzc o rng" ugv" qh" rkzn" xgevqtu" ctg" hexqwtgf" d {" vjg" gzrgtv" qdugt xgt." cpf" vjg" xgevqtu" ctg" cffgf" vq" vkuuwg" encuugu" yjkej" ctg" wpmkng0"
Uggf" I tqykpi" Ogvjqf"	Kpfrgpfgpv" uggf" rtqrcicvkqp" ycu" fppg" jgtg0"
J {dtkf" Fghqt ocdng" oqfgn." Ogv" Oqtrju" oqfgn." Vgzwtg" Kpvgitcvkqp." Itrjkecn" Oqfgn." Ngctkpi" Ogvjqf"	Kv" eqppgevu" dqvj" ujcrg" cpf" vjg" kpukfg" uwthceg." kvu" uvcwu" ctg" cejkxgf" eqjgtpe {" htq o" tgikqp" kphqt o cvkqp" cpf" dqwpfct {" kp" c" tqwvkpg" cnvgtpcvkxg" uvtwevtg0"
Hw {"E"ogcpu"Enwuvgtkpi" Cniqtkvj o*HEO+.Pgwtcn" Pgv yqm" Oqfgn"	Qrvkocn" ncdgnkpi" qh" vjg" kocig" rzkznu" ctg" rtqeguugf0"
Cvncu" Ocvjki" Vgejpkswg." Hkpkvg" Gng ogpv" Ogvjqf*HGO+"	Uvk o wncvkqp" qh" kpxcukqp" qh" vjg" IDO" kp" vjg" dtckp" rctgpej { ocl0"
Oqtrjqnqikecn" qrgtcvkqpu." Nqy" ngxgn" mpqyngfig" dcugf" ugi o g p v c k q p" twng." Cfcvxxg" Jkuvqitc o" Cpcn {ukul0"	Vq" ugi o g p v" vjg" jvgvtq i g p g q w u" vkuuwgu" htq o" fqwdng" gejq" OT" kocigu0" Uqhv" vkuuwg" qwnkpgu." vjg" dppg" gnk o k p c v k q p" ku" qeewttgf" jgtg0"
Gzrgevcvkqp" Oczk o k cvkqp" uejg o g*GO+"	Kvu" r g t h q t o c p e g" ku" n q y g t" v j c p" Ugok/Cwvq o cvgf0"
Cwvq o cvke" Vyq o" f k o g p u k q p c n" Ugi o g p v c k q p"	Vq" ugi o g p v" gcej" cpf" gxgt {" RGV" rncpg0"
Vgzwtg" Hgcwvtgu." Ugnh/ Qti c p k k p i" Ocr *UQO+"	Kp" dtckp" OTK" kocig." vjg" vw o qt" ctgc" ku" ugi o g p v g f0"

Oqtrjqnqikecn" Qrgtcvkqpu." Hw {" oqfgn" qh" Tgikqpu" qh" Kpvgtguv* TQK+ "	Kv" tgrtgugpvu" vjg" mpqyngfig" cdqww" vjg" flucvpeg." ujcrg" cpf" cnuq" kpvgtcvkqpu" qh" xctkqwu" uvtwevtgu" oqtg" cr r t r t k c v g n { 0"
Hw {"E"ogcpu"	Ugi o g p v c k q p" kocigu" ctg" igpgtcvgf" htq o" tcy" OT" kocig" fvc" yjkej" ku" wugf" vq" fkurnc {" vjg" enkpcem {" k o r q t w c p v" pgwtq/ c p c v q o k e" v k u u w g" c p f" e q p v t c u v" k p h q t o c v k q p" c d q w w" p g w t q / r c v j q n q i k e" v k u u w g 0"
Tgikqp" Dcugf" Ogvjqf." Tgikqp" I tqykpi" Ogvjqf." Ownvk" Tguqnwkqp" Gfig" Fgvgevkqp" Ogvjqf." Oqfkhgf" Tgikqp" Ugi o g p v c k q p 0"	Vjg" Ownvk" Tguqnwkqp" kocigu" ctg" wvknk gf" hqt" ugi o g p v c k q p" qh" dtckp" vkuuwg" uvtwevtg0"
Itrj/ Dcugf" Ogvjqf." I" Ygkijvgf" C i i t g i c v k q p" Cniqtkvj o 0"	Kp" fkhkewnv" ecugu" vw o qt" ugi o g p v c k q p" rtqegu" ku" fppg" yjkej" cnuq" Kp fkecvgu" vjg" dgpgkhu" qh" kpeqtrqtcvkpi" o q f g n / c y c t g" chhkpkvkgu"
Kvgtcvkxg" Ugnh/ Qti c p k k p i" Fvc" Cpcn {uku" Vgejpkswgu." Wpuwrgtxkugf" Eq o r w v g t" Ugi o g p v c k q p" Cniqtkvj o." Pqxgn" Oqfgn"	Uki pkhkecpv" k f g p v k h k e c v k q p" q h" Ownvk/ rctc o g v t k e" K U Q F C V C" xqnw og"
Ownvk/uecng" Ogvjqf." Ownvk/ uecng" nkpmkpi" Oqfgn." Uwrgtxkugf" Ugi o g p v c k q p" Ogvjqf"	Kv" u j q y u' c p' g t t q t u' c t g' k p' v j g' q t f g t' qh." qt" u o c m n g t' v j c p' t g r q t v g f' c t v k e n g 0"
Ugok/Uwrgtxkugf" Hw {"E/ Ogcpu" Enwuvgtkpi" Ogvjqf." M/pgctguv" pgkijdt." Itrj" ngxgn" Vj t g u j q n f k p i" c p f" Uggf" I tqykpi." Ocpwcn" Rkzgn" Ncdgnkpi"	Vjku" o g v j q f" g p u w t g u" v j g" n g u u" q r g t c v k q p" v k o g" c p f" i q q f" r g t h q t o c p e g 0"
J {dtkf" ngxgn" ugv" *JNU+"	Rtqxkfgu" qdlgewkxg." Ugi o g p v c k q p u" c p f" T g r t q f w e k d n g" y j k e j" c t g" c m" e n q u g" v q" v j g" o c p w c n" t g u w n v u 0"
Hw {"Oqfgn"	Eqttgev" fgvgevkqp" ctg" hqwpf" htq o" cxgtcig" r tqdcdknkv { 0"
Fghqt ocdng" Oqfgn." Ogf/ Xqnv o g v g t"	Wpfgt" ngxgn" ugv" htc o g" v j g" v c t i g v" c t g c" ku" ugi o g p v g f 0"
5F" Xctkcvkpcn" Ugi o g p v c k q p" Ogvjqf"	Ceewtcvgn {" vjg" vw o qt" ctgc" ycu" ugi o g p v g f 0"
M/pgctguv" pgkijdt" Cniqtkvj o"	Rtghgttgf" vq" vtckp" vjg" rcwgtpu" htq o" vjg" ejqugp" tgikqpu"
Cwvq o cvke" Pqgpcvci" *Cvncu" Ftkxgp+"	Htq o" vjg" OTK" vjg" dtckp" vkuuwg" uvtwevtg" ku" ugi o g p v g f 0"
Hw {"E/Ogcpu" Enwuvgtkpi"	Kv" k o r t q x g u" v j g" e q j g t g p e g" q h" v j g"

Cniqtkvj o"	ugi o gpvcvkqp"rgthqt o cpeg"
M/ o gcpu"Enwuvgtkpi" o gvjqf"	Xctkquwv{ rgu"qh"vkuuwgu"ctg" kpeqrqtcevqf"cmn"vj cv" y jgp" encuukh{kpi"xqzgnu0"
Hw { "m/ o gcpu."Cpv"eqnqp{ " qrvk ok cvkqp"	Hqt"pqkug"tgfwevqpv"vtgujqnflkpi" ku"rgthqt o gf"jgtg0"
Uwrgrtkugf"vgejpkswg/ Oqwpvcvkp"Ogvjqf."M/ Oczk o w o"Nkmgnkjqjff."M/ pgctguv"pgki jdqwt."Ctvkhkecn" pgwtcn"pgv y qtm0"	Gzegmgpv"rctvkqpu"ctg"rtqfwegf" jgtg"htq"nctig"co qwpv"qh"fcvc"ugvu0"
Fkuetvgv" F {pc oke"Eqpvqwt" o qfgn"	Kp"dtckp"OTK"vj cnc o wu"cpf" uk o knct"qdlgevu"qh"kpvtgtuv"ctg" ugi o gpvfg0"
Mf"vtgg/dcugf"m/ o gcpu*MO P+."Oczk o w o" rquvgtkqt"OTH" o gvjqf*OCR/OTH+"	Kv"guvk o cvgu"vj g"cxgtc ig"vk o g" cevxkv{ "ewtxg"VCE+"cpf"cnuq" guvk o cvg"vj g"mkpgvke"rctc o gvgtu" ctg"wguf"vq"ngcf"vq"kp"ceewtceku""0"
Gzrgevcvkqp/Oczk ok cvkqp" *GO+"	Htq o"v3"cpf"v4"y gki jvgf"ko cig" nkmg"YO."IO"cpf"EUH"ctg" ugrctcvfg0"
Encuuke"upcmgu."Fghqt o cdng" Eqpvqwt" o qfgn"	Ykvj"vj g"jgnr"qh"nq y o eapvtcu" uvtwevwtgu"cpf"fkueqpvkpwqu" gfi gu"ctg"ugi o gpvfg"htq o"vj g"v3" y gki jvgf"ko cigu"qh"vj g"dtckp0"
Mqjqpqpou"eq o rgvkvxg" ngctkpi""cniqtkvj o."Hw { " MEN."Hw { /uqhv"MEN"	C"Txgfwekqp"qh"pqkug"ghghevu"kp" vj g"o g fkecn"ko cig0"
Octmxx"tcpfq o"hgknf" o qfgn"	Ukping"ugswgpegu"ctg"qdvckpgf" htq o"vj g"ugi o gpvcvkqp"qh"o wnwkrng" ugswgpegu"kp"vj g"ixgp"ko cig0"
Ipggtcnk gf"hw { " qrgtcvqt*IHQ+."Eqpvqwt" Fghqt o cdng" o qfgn"	Ugi o gpvcvkqp"qh"vw o qt"tgikqpu" ctg"rtqeguugf0"
Cvncu/dcugf"ugi o gpvcvkqp"	Ncdngf"uvtwevwtgu"ctg"rtqrcicvfgf" qp"vq"vj g"OTK"
Gzrgevcvkqp/Oczk ok cvkqp" Vgejpkswg."Tqdguv" Guvk o cvkqp."XCNOGV" Ugi o gpvcvkqp"xcnkf cvkqp"vqqn"	Kv"Ugi o gpvu"vj g"vw o qt."gfg o c"cpf" xgpvtkengu"
Ownvkc gt"ugi o gpvcvkqp." Cwvq ocvke"tgikqp" ugi o gpvcvkqp"	Ugi o gpvu"vj g"qtkikpcn"ko cig"kpqv" fkhhtgtpv"urcvkn"tgikqpu0"
Eqpvgpv/dcugf"tgvtgxcn" vgejpkswg"	Uweeguuhwn"ugi o gpvcvkqp"qp" ko cigu"
Cvncu/ftxgp"ugi o gpvcvkqp"	Uweeguuhwn{"vw o qt"tgikqpu"ctg" ugi o gpvfg"Cwvq ocvkecn"0"
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Vjg"iterj/vjgqgtvke" xctkcvkpcn"ugi o gpvcvkqp" o gvjqf."m/pgctguv"pgki jdqwt""	C"tguwnvu"qh"jki j"swcnkv" ugi o gpvcvkqp0"
Cevkxg"Eqpvqwt"Oqfgn"	Rtqeguukpi"vj g"Ugi o gpvcvkqp"kp" vw o qt"tgikqpu"wukpi"OTK"uecp0"
Gxcnwcvkpi"Kocig" Ugi o gpvcvkqp"Cniqtkvj o"	Cr rgt"jki j"ceewtce{"fwtkpi" ugi o gpvcvkqp0"

Hw { "o gcp" Cniqtkvj o*HEO+."Uknj qxgwge" Ogvjqf*UO+"	Htq o"vj g"fcvc"qh"OTK"kv"rtqxfku" c"uk o rng"yc{"vq"kf gpvkh{"vj g" crrtrqtkcvg"uvtwevwtg0"
Eqpvqwt"Vtckpi"Cniqtkvj o." Tgikqp"Ugi o gpvcvkqp" Ogvjqf"	Guvcdnkj o gpv"qh"gf ig"tgikqpu"ctg" ugi o gpv"vj g"ko cig"kpqv" o gcpkpihwn"tgikqpu0"
U{pvjgvke" I tqwvf"Vtwvj" Oqfgn."Dkq o g e j c p k e c n" Oqfgn"	Ogcuwgt o gpv"qh"rcvj qnqi {"ku" rgthqt o gf"ykvj"tgncdng"i tqwvf" vtwvj0"
Uqhv/Octikp"Uwr rqtv"Xgevqt" Ocejkgp*UXO+"	Kv"rtqegu"o kmmkqpu"qh"vtckkpiu" cpf"vguvki o u"ngxgn"kpucpvn {"cpf" kpxqnxgf"ykvj"tgncvkggn {"u o cmm" hgcvwtg"ugv0"
Cfcrvkvxg"Urcvken" Fgvgt o kpluvke" Cppegcnkpi.Enwuvgtkpi" Cniqtkvj o"	Okuencuukhkecvkqp"gttqt"ku" guvk o cvgf"jgtg."y jkej"ku"chhgevgf" d{"pqkug"cpf"cnuq"kv"i gpgtcvgu" ceewtcvg"ugi o gpvcvkqp"tguwnvu0"
m/ o gcpu"Enwuvgtkpi" Cniqtkvj o"	Ceewtcvg"ugrctcvkqp"qh" dcemi tqwvf"dtckp"rkzgn0"
m/ o gcpu"Enwuvgtkpi"	Kv"eqpxgtvu"vj g"itc{/ngxgn"OTK" ko cig"kpqv"ceeqnq"urceg"ko cig." cnuq"kv"ugrctcvg"vj g"rqukvkqp"qh" vw o qt"htq o"OTK"ko cig0"
Uvcvkvken"Oqfgn."Octmxx" Tcpf q o"Hkgnf."Ngxgn"Ugv" Ogvjqf."Pqp/Wpkhqt okv{" Eqttgevkqp"Ogvjqf"	Kv"tg o qxgu"vj g"Pqp/dtckp" uvtwevwtgu"cpf"kv"guvk o cvgu"vj g" vkuuwg"dcugf"qp"kpvpukv{" xctkcvkqp0"
Rj {ukeu"Dcugf" Fghqt o cdng" Qt icpk u o"	Kv"jcu"ceecrdknkv{"vq"eqpvqpn" r j {ukeu"dcugf" fghqt o cvkqpu"cpf" cnuq"vq"fgtgcugu"vj g"gttqt"cvgl0"
Ownvk/Uecng"Ycvgtujgf" Ugi o gpvcvkqp"	Vjg" uwdugv" qh" vjg" gzrgevgf" tgikqpu" vq" dg" ugngevgf" cwvq ocvkecn"0"
Fghqt o cdng" Tgikqp"Oqfgn." Kvgtcvkxg" I tqykpi"Ogvjqf." Ujtkpmkpi"Ogvjqf"cpf"Upcmg" Ogvjqf"	Vq"nqecvg"vj g"dqwpfctkgu"qh"cp" qdlgev"gcukn"0"
Jkf fgp"Octmxx"Ejckp" Oqfgn* JOE+"	Vq"rtqxfkg"dgvgt"tguqnvkqp"kp" xctkquw"urgetvcn."urcvkn"cpf" vg o rqtcn"fcvcou0"
Uggfgf" Tgikqp" I tqykpi" Oqfgn."Cevkxg"Eqpvqwt" Upcmgu"Oqfgn"	Dcugf" qp" gzvtcevkqp." vjg" ugv" qh" rkzgn" ctg" eqppgevgf" cpf" y jqug" rkzgn" kpvgpukvku" ctg" eqpukvgpv" ykvj" gzkuvki" rkzgn" uvcvkuken" qh" c" uggf"rqkp0"
J {dtkf"ngxgn"Ugv"* JNU+ " Oqfgn"	Wugf"htq"ugi o gpvki"vj g"gfg o c" cpf"vw o qt"kp"vj g"dtckp"ko cig0"
Mqjqpqp"Ugnh"Qt icpk kpi" Ocr"	Wugf"vq"eqpxgtv"vj g"OTK"fcvc"kpqv" ugevqtu"y jkej"jcxg"jq o qigpqwu" ejctcevgtkvkeu0"
Gzrgevcvkqp"Oczk ok cvkqp" Cniqtkvj o."Ownvk/Nc gt" Octmxx"Tcpfq o"Hkgnf0"	Rtghgtgf"vq"kf gpvkh{"vj g"uwdugvu" qh"vj g"cpvkekr cvg"tgikqpu" f {pc o kecm"0"
Rqrwncvq/Dcugf"Vkuuwg" Ocru."M"Pgctguv"Pgki jdqt" Oqfgn0"	Rtqxfkgu"jki j"ceewtce{"vj cv" urgekkgf"vq"xctkquw"vkuuwg"v{ rgu0"

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""7cbW igjcb."

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vgejpkswgu" yjkej" xcuv" hqt" vyq" fgecfgu" Ogfkecn" Kocig"
Rtqeguukpi" rnc{u"cp"ko rqtvcpv" tqng" kp" vjg" hwwtg" qh" ftwi"
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gpjcepeg ogpvu"kp"vjg" hwwtg" dg{qpf"vjg"rtqrgtkvku"cpf"vjg"
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FYZYfYbWYg'

- 13_ Cokp" N." Uqncpkcp/\cfgj" J." Nwecu0E*4225+.<
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OTKö."Rtqel"KpmlUqel0Oci0Tguqp0Ogf0330"
14_ Ctkc" V|kmc0C." Octke" M0\ ctkhk." Nnkpcp" Iqw o pgtqxc."
Nqwmcu" I0Cvutmcu.Fcxkf" \wtcmqyumk." Vkpc" [qwp/
Rqwuuckpv."Fqwinu"0" Cp vj q p". "T0Okejcg"Ueqw."Rvgt"
OeN0Dncem*4224+0öPgwqt kocikpi" kp" Rgfkctke" Dtckp"
Vw o qtu<" I f/FVRC/Gpjcepeg." go qf{p c o k e." cpf"
Fkhhwukqp" OT" " Kocikpi" Eq o rctgf" ykvj"
OTUrgvtqueqrke"Kocikpiö."Pgwqtcfkqn"45."xqnw og"4"
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ujcjoqtcf." Jcokf" uqncpkcp/\cfgj." tglc"
C0\qtqqhk*4226+.<" öOTUKö" Dtckp" vw o qt"
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16_ Htqo" Pcpq" vq" Ocetq." 6vj" KGGG" Kpvgtpcvkqpcn"
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öCwwq o cvke" Dtckp" Vw o qt" Ugi ogpvckqp" Wukpi"
Fkhhwukxkv{" Ejectcevgtkvkuö." Dkq ogfkecn"
Kocikpi<r09:2"/9:50"
17_ Ogf"Kocig"Eq o rrwgt"Cuuku"Kpvgtx"Kp"Eqph"<Dgpgfkevq"
Oqtv o gv." " Fqpinkp" \gpi." Iwkfq" Igtki." Octegn"
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Xqnw ogu" Wukpi" Fgukipgf" OT" Dtckp" Fcvdcugö."
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18_ Cwvutcnkcp" Eq o rrwgt" Uqekgv{" Rcp/U{fpg{" Ctgc"
Yqtmujqr" qp" Xkuwcn" Kphq o cvkqp" Rtqeguukpi<Dtckp"
Rctmgt" cpf" Fcxkf" Feicp" Hgpi" *4224+0" öXctckvkqpcn"
Ugi ogpvckqp" cpf" REC" Crrnkf" vq" F{p c o k e" RGV"
Cpcn{ukuö0"
19_ KGGG" Kpvgtpcvkqpcn" eqphgtgpeg" qp" Xktwcn""

- Gpxktq o gpv." Jwocp/Eq o rrwgt" kpvgtcegu" cpf"
Ogcuwtf ogpv" U{uvq ou" <" Ejwp{cp" lkepi." Zkpwjw<"
\jcp." Ycplwp" Jwepi." Ejtquvrj" " Ogkpgn*4226+<"
öUgi ogpvckqp" cpf" Swcpvkckvkqp" qh" Dtckp" Vw o qtö."
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Eqtkpc" U0Ftrcec.Xcngtkg" Ectfpgpu.Eqnpk"
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gxqmwkqp" htqo" dtckp" OT" " Kocig" ugswwpegu" wukpi"
o wnw/rjcug"ngxn""ugvö."Xqnw og"322"kuuwg"5."rr0534/
54;0"
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Lcigtucpf*4229+<" ö5F" Xctckvkqpcn" Dtckp" Vw o qwt""
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]32_ KGGG" Vtcpuvevkqpu" qp" Ogfkecn" kocig" rtqeguukpi."
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öXguugn"Vqtwqukv{"cpf"Dtckp"Vw o qt""Ocnkpicpep{<"C"
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]34_ Urtkpiqt"nkpm"qp"ujqtv"eq o owpkcvkqpu<" Iwkfq" Igtki."
Octegn" Rteucyc." Yknl" Nkp." Lqjp" Ikn o qtg" *4225+<"
öCuuguukpi" Gctn{"Dtckp" Fgxnqr ogpv"kp" Pqapcvu" d{"
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4:9;14225."rr0";9;/;:20"
]35_ KGGG" qp" " Aerospace and Electronic Systems
Magazine"<" Jkfgmk" {c o c o q q" cpf" Mcvujkmg"Uwivc."
Pqtkm" Mcp|cmk." Kmww" Lqjlc" cpf" [qujk" Jktcmk."
Okej{qujk" " " wycjctc*3;:2+<" öOcicpve" Tguqpepeg"
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7."kuuwg<8.r053/57."Lwpq"3;:20"
]36_ Rtqeggfkpiu"qh"vjg"KGGG"<"Lc{ctco" M0Wfwrc."Rwpc o"
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]37_ Kpvgtpcvkqpcn" Uqekgv{" hqt" Qrvku" cpf" Rjqvqkpu" <"
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Uej o kfv." Egnkpc"Kokgnkpmc."Rwpc o" M0"Ucjc." Igtig" L0"
I t x g t c . " [k p i " \ j w i g . " N 0 " O 0 " E w t t g . " R c v " O a n j a m . " c p f "
[k p r g p i " L k p * 4 2 2 4 + < " \$ O g v j q f q u i { " h q t " g x c n w c v k p i "
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4 2 2 4 < " K o c i g " R t q e g u u k p i . " x q n l " 6 8 : 6 . r r 0 " 4 8 8 / 4 9 : 0 "
]38_ Gnugxkt" qp" Eq o rrwgt" Ogjvfu" cpf" Rtqitcou" kp"
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Ctwp"Uqqf*4228): "Ugi ogpvckqp" qh" dtckp" vw o qtu" kp"
6F" OT" kocigu" wukpi" vjg" Jkffgp" Octmqx"
oqfgnö.WUC.Xqnw og" :6." Kuuwg" 4." rr0" 98/:7."
Fgegodgt"42280"

- 139_ UrtkpiqtNkpm" qp" Ogfkecn" Kocig" Eqorwvki" <
Lghhtg{"Uqnoq"qp."C0"Dwv"ocp.Ctwp"Uqqf*4226+<ö" Fcvc"
Ftkxgp" Dtckp" Vwoqt" Ugiogpvcvkqp" kp" OTK" Wukpi"
Rtqdcdkkuvke" Tgcuqkpi" qxgt" Urcegg" cpf" Vkogö.xqn"
5438.rr0523/52;0"
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14:_ KGGG" <O0" P0." Nkp." E0" E0." (" Ejcpi." E0" E0" *4229."
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m/ogcpu"enwuvgtkpi"ugiogpvcvkqp0"kp"kkj/our"*rr0"467/
472+0"
"
- 13:_ 4;vj" Cppwcn"Kpvtgpcvkqpcn"Eqphgtgpeg"qh"vjg"KGGG"kp"
Gpikpggtkpi" kp" Ogfkekgp" cpf" Dkqni{" " " " Uqekgv{" <
Medkt0[" Fqlcv0O." Uejgtgt0D." Hqtdgu0H."
Ictdc{0E*4229+<" öOwvkv"oqfcn" OTK" Ugiogpvcvkqp" qh"
kuejgöke"uvtqm"Ngukpuö."rr0"37;7/37;.: "Crtn"42290"
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14:_ OKEECK"Rtqeggfkpi"<Pcvjcp"Oqqp."Gnk|cdgvj" Dwnkvv."
Mqgp" Xcp" Nggorvw." Iwkfq" Igtki*4224+öCwqocvke"
Dtckp"cpf"Vwoqt"Ugiogpvcvkqpö."NPEU"46: : *3+*594/
59;0"
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- 13:_ Kpvtgpcvkqpcn"Uqekgv{"hqt"Qrvkeu"cpf"Rjvqvkpcu"Rqrwtk."
Mctvggm." Fcpc" Eqd|cu." Octvkv" Lcigtucpf." Utkuj" N0"
Ujcj."cpf" Cndgtv"Owtvjc*422;+<"\$5F"xctckvkqpcn"dtckp"
vwoqt" ugiogpvcvkqp" qp" c" enwuvgtgf" hgcvwtg" ugv0\$"
Kp"Ogfkecn" Kocikpi" 422;<" Kocig" Rtqeguukpi." xqn0"
947;.: "rr0"947;3P0"
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152_ KGGG" qp" Ogfkecn" Kocikpi"<" Qnxkgt" Encv|." Oczkog"
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Uk"oqp" M0Yctkgnf." Itgiktgt" Ocncpfckp." Pkejncu"
C{cejg*4227+<" öTgcnkuvke" Uk"o wncvkqp" qh" " vjg" " 5/F""
Itqyvj" qh" Dtckp" Vwoqtu" kp" OT" Kocigu" Eqwrnkpi"
Fkhhwukp" Ykvj" Dkqogejcpcn" Fghqtocvkqpö." Xqn046."
rr03556/3568.Qev"42270"
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- 142_ Colpk." Nefcp." J0" Uqncvckp/\cfjg." cpf" E0"
Nwecu*4224+0"\$Eqorwvgt"xkukqp"ugiogpvcvkqp"qh"dtckp"
uvtwewtgu" htqo" OTK" dcugf" qp" fghqtocdng" eqpvqwt"
oqfgnu0\$Wpkxgtukv{"qh"Vgjtcp"
"

153_ Rtqeggfkpiu"qh"vjg"Hqwtvj"Kpvtgpcvkqpcn"Eqphgtgpeg"qp"
Eqorwvgt" cpf" kphqtocvkqp" Vgejpaqi{"*EKV026+<" Rcp"
Nkp" .[qpi" [cpi." Ejqpi/Zwp" \jgpi." Lkcp/Ygp"
Iw*4226+<" öCp" Ghkckgpv" Cwqocvke" " Htcogyqtm" hqt"
Ugiogpvcvkqp" qh" OTK" Dtckp" Kocigö.rr0: : 8;/22."
Ugrvgodgt"36/Ugrvgodgt"38.KGGG0"
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- 143_ KGGG" <" Ngwpi" E0E.Ejgp" H." Myqm" R0E0M.Ejcp"
H0J0[" *4225+öDtckp"Vwoqt"Dqwpfct{"fgvgevkqp"kp"OT"
Kocig" ykvj" Igpctnk|gf" Hw||{" Qrgtcvtö.xqn05.rr0"
3279/3282."36/39.Ugrv042250"
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154_ Gnugxkgt" qp" Ogfkecn" Kocig" Cpcn{uku" Rvgvt" Nqtg|gp."
Octegn" Rtcuvcy." Dtcf" Fcxku." Iwkfq" Igtki." Gnk|cdgvj"
Dwnkvv." Uctepi" Lqujk" *4228+<" öOwvkv/oqfcn" kocig" ugv"
tgikuvtkqp"cpf"cwcu"htqocvkqpö." Xqn"32.kuuwg5." Rci gu"
662/673.Lwpg42280"
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- 144_ Cecfgöke" Tcfkqni{|<Octegn" Rtcuvcy." Gnk|cdgvj"
Dwnkvv." Pcvjcp" Oqqp." Mqgp" xcp" Nggorvw." cpf" Iwkfq"
Igtki*4225+0" Cwqocvke" Dtckp" Vwoqt" Ugiogpvcvkqp"
d{" Uwdlgev" Urgekhe" Oqfkhkecvkqp" qh" Cwcu" Rtkqtu0" Xqn"
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155_ KGGG<" Rvgvt" Nqtg|gp." Uctepi" Lqujk." Iwkfq" Igtki." cpf"
Gnk|cdgvj" Dwnkvv*4223+<" öVwoqt/Kpfwegf" Uvtwewtcn"
cpf" Tcfkqogvtke" Cu{oogt{" kp" Dtckp" Kocigö."
RR38563920"
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- 145_ Ogfkecn" Kocig" Cpcn{uku" *OgfKc+<Octegn" Rtcuvcy."
Lqjp" J0" Ikn"oqtg." Ygnk" Nkp." cpf" Iwkfq" Igtki*4227+ "
Cwqocvke" Ugiogpvcvkqp" qh" OT" Kocigu" qh" vjg"
Fgxgqrkpi" Pgydqt" Dtckp0" Xqn" ;. "kuuwg" 7." Rci gu"
679/688."Qevqdt"42270"
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156_ Gnugxkgt." Ocipgve" Tguqpeg" Kocikpi" <Ujcp0" \w0[".
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Hw||{|/Nqike" Gpeqfgf" Gzrgtv" Cpcvöke" "Mpqyngfigö."
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- 146_ Ogfkecn" Kocig" Cpcn{uku" *OgfKc+<Octegn" Rtcuvcy."
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157_ Rtqeggfkpiu" qh" vjg" 4: 'j' KGGG" GODU" Cppwcn"
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Cwiwuv"52/Ugrvgodgt"5.42280"
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- 147_ UrtkpiqtNkpm" qp" Ogfkecn" Kocig"
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Iwkfq" Igtki *4227+<" öU{pvjgve" Itqwpf" Vtwvj" hqt"
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596;.: "rr048/550"
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158_ Gnugxkgt." Rcvgt" " Tgeqipkvkqp" " " Ngvgtu" <Uk{cn" O0[".
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ogcpu" dcugf" cniqtqvj"o" hqt" dku" guvkvkqp" cpf"
Ugiogpvcvkqp"qh"dtckp" OTKö.xqn<48.kuuwg<35.RR<4274/
4284."Qevqdt"42270"
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- 148_ Kpvtgpcvkqpcn" " Lqwtpcn" qh" Ecpegt" tgugetj" cpf"
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Mctpcp." Nqigujyctk" V" *4232+<" öCp" Kortqxfg"
koringogpvcvkqp" qh" " Dtckp" vwoqt" fgvgevkqp" wukpi"
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159_ Rgticoqp" qp" " Eqorwvgtk|gf" Ogfkecn" kocikpi" cpf"
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- 149_ KGGG" Eqorwvgt" Uqekgv{" Ycu|kpi"vqp<" Octm" Uejokfv."
Kn{c" Ngxpgt." Tguugn" Itgkpgt." Cndgtv" Owtvjc." Ccnq"
Dkuvtkv|*4227+<" öUgiogpvcvkqp" Dtckp" Vwoqtu" wukpi"
Cnkipogp/Dcugf" Hgcwvwtgö." KGGG" qp" Rtqeguukpi" qh"
vjg" hqwtvj" Kpvtgpcvkqpcn" Eqphgtgpeg" qp" Ocejkpg"
Ngctkpi"cp"Crnkckvkqpu*KEONC027+." FE." WUC"0"
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15:_ Kpvtgpcvkqpcn" Lqwtpcn" qp" Cwqocvke" Eqpvtn" U{uvgo"
cpf" Gpikpggtkpi<Vjcpicxgn0M." " Mctpcp0O."
LcicpcvjcplR." Rgvjcnemujök" Ukxc" Mwoc0t0T" cpf"
Iggvjc" Tc"ocpk*4227+." öCp" Eqnqf{" Cniqtqvj"ou" kp"
"

- Flxgtug" Eq odkpvcvkqpcn" Qrvk ok|cvkqp" Rtqdnq ou" /C"
Uwtxg{.ö"Xqn0"8."kuuwg<"3."r r<"9/480"
"
- 15: Hqwtvj" Kpvgtpcvkqpcn" Eqphgtgpeg" qp" kocig" cpf"
I tcr jkeu." KGGG<"Zkcq" Zwcp." S kpi okp" Nkcq*4229+ " 0"
öUvcvkuvkecn"Uvtwevtg"Cpcn{uku"kp"OTK" Dtckp" Vw oqt"
Ugi o g pvcvkqpö."44/46."RR<"643"/"6480"
"
- 162_ Cwvutckcp" Eq o rrwgt" Uqekgv{." Rcp" U{fpg{" Ctgc"
Yqtmujqr" qp" Xkuwcn" Kphqto cvkqp" " Rtqeguukpi<" Zkp"
Dck." Lguug" U0Lkp." Fci cp" Hgpi*4225+<" öUgi o g pvcvkqp"
Dcugf" O wvkn c{gt" Fkc i pquku" Nquunguu" Og fkecn" Koc ig"
Eq o r tguukqp".RR< ;/36"
"
- 163_ Rcp i/U{fpg{" Ctgc" Yqtmujqr" qp" Xkuwcn" Kphqto cvkqp"
Rtqeguukpi" *XKR" 4224+ " Eqphgtgpeg" kp" Tgugctej" cpf"
Rtceveg"kp"KV<"\ jg"ejgp." Fcxkf" Fci cp"Hgpi." Ygkfapi"
Eck*4225+<" öCwvq o cvke" Fgygevkqp" qh" RGV" Ngukqpuö." ."
Xqn044."U{fpg{0"
"
- 164_ Gnugxktg." Oc ipgvke" Tguqpeg" Koc ikpi" <"\ w [0Ujcp." Lkpi"
\ 0Nkw." I wcp i" J 0 [wg*4226+ö" Cwvq o cvgf" J w o cp"
Htqpvcn" nqdg" Kfgpvkhkecvkqp" kp" OT" k o c i g u" dcugf" qp"
Hw|{|/Nqike" Gpeqfgf" Gzrgtv" Cpcv o ke"
Mp q y n g f i g ö . x q n w o g < 4 4 . k u u w g < 7 . R R < 8 2 9 / 8 3 9 0 "
"
- 165_ I qrcn." P0" Pcpfjc." cpf" O0" Mctpcp0" \$Fkicipqug" dtckp"
vw oqt"vjtqw i j" OTK" wukpi" k o c i g r t q e g u u k p i " e n w u v g t k p i "
cniqtkv j o u" uwej" cu" Hw|{|" E" Ogcpu" cnqpi" ykvj"
kpvgnki gpv" qrvk ok|cvkqp" vgejpkswgul\$ " Eq o r w w c v k q p c n "
Kpvgnki gpeg" cpf" Eq o r w w k p i " T g u g c t e j " * K E E K E + . " 4 2 3 2 "
KGGG"Kpvgtpcvkqpcn"Eqphgtgpeg"qp0"KGGG."42320"
"
- 166_ Wpfg." C o k v" Ucvku j . " X 0 " C 0 " R t g o r t e m c u j . " c p f " R t c x g g p "
Ucpmctcp0" \$C" p q x g n " g f i g " f g y g e v k q p " c r r t q e j " q p " c e w k x g "
eqpvqt" hqt" vw oqt" ugi o g pvcvkqp0\$ " Gp ikpggtkpi" cpf"
U{uwg ou" *UEGU+."4234"Uwvfgpvu"Eqphgtgpeg"qp0"KGGG."
42340"
"
- 167_ Rctggm." Oggpcmujk." E0" M0" Ljc." cpf" Ucwtdcj"
Owmjgtlgg0" \$C" P Q X G N " C R R T Q C E J " H Q T " V J G "
G Z V T C E V K Q P " C P F " E N C U U K H K E C V K Q P " Q H "
V W O Q T " K P " O T " K O C I G U " Q H " V J G " D T C K P " X K C "
R T K P E K R N G " E Q O R Q P G P V " C P C N [U K U " C P F "
M G T P G N " U W R R Q T V " X G E V Q T " O C E J K P G 0 \$ "
Kpvgtpcvkqpcn" Lqwtpcn" qh" C f x c p e g f " T g u g c t e j " k p "
Eq o r r w g t " U e k g p e g " : 0 9 " * 4 2 3 9 + 0 "
"
- 168_ Mcwt." Wwv o l g g v . " T e l g u j " U j c t o c . " c p f " O c p f g g r "
Fqucplj0" \$Ecpetu" vw oqt" fgygevkqp" wukpi" oc ipgvke"
tguqpcpeg" k o c i k p i " y k v j " c p v " e q n q p { "
cniqtkv j o ö K P V G T P C V K Q P C N " L Q W T P C N " Q H "
K P P Q X C V K X G " T G U G C T E J " K P " G N G E V T K E C N . "
G N G E V T Q P K E U . " K P U V T W O G P V C V K Q P " C P F "
E Q P V T Q N " G P I K P G G T K P I " " X q n 0 " 6 . " K u u w g " 4 . "
Hgdwtct{"4238"
"
- 169_ Mcvjcpg." Ocpqlmw oct." cpf" Xkncu" Vjcmctg0" \$Cp"
kpvgnki gpv" cr rtqcej" hqt" cwvq o cvke" dtckp" vw oqt"
fgygevkqp0\$ " Kpvgtpcvkqpcn" Lqwtpcn" qh" Gp ikpggtkpi" cpf"
kppqxcv kxg" Vgej p q i { " 5 0 9 " * 4 2 3 6 + < " : 4 / : 6 0 "
"
- 16: Ugnxpc{cmk." M0" \$Kpvgnki gpv" dtckp" vw oqt" vkuuwg"
ugi o g pvcvkqp" htq o " oc ipgvke" tguqpcpeg" kocig" * o t k + "
wukpi" ogvc" j g w t k u v k e " c n i q t k v j o u 0 \$ " L q w t p c n " q h " I n q d c n "
Tgugctej"kp"Eq o r r w g t " U e k g p e g " 6 0 4 " * 4 2 3 5 + < " 3 5 / 4 2 0 "
"
- 16: Cpcpficqpmct." Icwtk" R0." cpf" Icpguj" U0" Ucdng0"
\$Fgygevkqp" cpf" kfgpvkhkecvkqp" qh" dtckp" vw oqt" kp" dtckp"
OT" k o c i g u" wukpi" Hw|{|" E/ogcpu" ugi o g pvcvkqp0\$ "
Kpvgtpcvkqpcn" Lqwtpcn" qh" Tgugctej" kp" Eq o r r w g t " c p f "
Eq o o w p k e c v k q p " G p i k p g g t k p i " X q n 0 " 4 " K u u w g " 3 2 " * 4 2 3 5 + 0 "
"
- 172_ Mcwujkm." Fkx{c." gy" cn0" \$Dtckp" vw oqt" ugi o g pvcvkqp"
wukpi" igpgvke" cniqtkv j o 0 \$ " Kpvgtpcvkqpcn" Lqwtpcn" qh"
Eq o r r w g t " C r r n k e c v k q p u I * K L E C + * 2 ; 9 7 6 : : : 9 + "
Kpvgtpcvkqpcn" Eqphgtgpeg" qp" C f x c p e g u " k p " Eq o r r w g t "
Gp ikpggtkpi" (" C r r n k e c v k q p u " * K E C E G C / 4 2 3 6 + " c v "
K O U G E . " I \ D 0 " 4 2 3 6 0 "
"