CVEN9000

7]j]`'9b[]bYYf]b['8Yg][b'DfUWf]W



CVEN9000 // Term 1, 2022 // published at 15-02-2022 © UNSW Sydney, 2022

7 ci fgY⁻Cj Yfj]Yk

GHJZZ7cbHJWh78YHJ]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cWUhjcb	D\cbY
6UVU_ G\U\VcXU[\	<u>V"g\U\VcXU[\4 i bgk "YXi "Ui</u>		79`)\$+ž7]j]` 9b[]bYYf]b[6i]`X]b[

GWXcc``7cbHJWhi=bZcfaUhjcb

<u>9b[]bYYf]b[_Gh XYbhGi ddcfhGYf]]W</u>g'-H\Y'Bi WYi g'!'Ybfc`a Ybhž'dfc[fYgg]cb'W\YW_gžWUg\'fYei Yghgž Wci fgY']ggi Yg'cf'dfc[fUa !fY`UhYX'ei Yf]Yg'

<u>9b[]bYYf]b[`=bXi glf]U``HfU]b]b[</u>`-`=bXi glf]U``lfU]b]b[`ei Ygl]cbg`

<u>I BGK Gh Xm5VfcUX</u> – gh XmUVfcUX gh XYbhYbei]f]Yg flcf]bVci bX gh XYbhgŁ

<u>I B G K '9 I W U U U Y</u> \$ % %

7ci fgY[·]8YHJ]`g

l b]hg cZ7fYX]h**

Gi a a UfmcZh\Y'7ci fgY

H\Y`WcifgY`]bjc`jYg`ibXYftU_]b[`UbX`Wcad`Yf]b[`U`gYf]Yg`cZXYg][b`HUg_g`]b`Y]f\Yf`Wj]``cf`Ybj]fcbaYbfU` Yb[]bYYf]b[`XYdYbX]b[`cb`k\Yf\Yf`ghiXYbfg`UfY`ibXYffU_]b[`f\Y`Wj]`cf`Ybj]fcbaYbfU``gffYUa"

7]j]`'9b[]bYYf]b['GhfYUa'fH%z*&\$&&Ł

H\]gʻdfcʻYWIVUgYX`]bhY[fUh]b[`WcifgY`]bjc`jYgʻZcfai`Uh]b[`XYg][bgʻZcf`UbX`gc`ih]cbgʻhcʻfYU`!kcfX`W]j]` Yb[]bYYf]b[`dfcV`Yag`]bʻh\Y`UfYUgʻcZ[YchYWkb]WUʻžghfi WifU`ž'UbX`dUjYaYbhYb[]bYYf]b["`H\Y`dfcV`Yag k]``VY`XfUkbʻZfca`]bXighfmUbX`k]``VY`ai`h]!X]gW]d`]bUfm]bjc`j]b[`h\Y`Udd`]WUh]cbʻcZaUhYf]U``YUfbh h\fci[\cihh\Y`ibXYf[fUXiUhY`dfc[fUa"`H\Y`WcifgY`k]``]bjc`jY`[fcid`dfc'YWikcf_`UbX`h\Y`dfYdUfUh]cb cZkcf_]b[`XfUk]b[g`UbX`dfcYWifYdcfhgʻg]a]`Uf`hc`h\cgY`fYei]fYX`]b`]bXighfm'`H\Y`cVYWfjY`]gʻhc`Zfh\Yf XYjY`cd`h\Y`ghXYbhgfifYgYUfW\Z`hYUakcf_žaUbU[Yf]U`ž'UbX`gY`Z]X]fYWhX`YUfb]b[`g_]``g"

H\]gʻmYUfž'h\Y`Vci fgY`]bj c`j Ygʻh\Y`XYHJ`YX`XYg][b`cZj Uf]ci gʻghfi Wi fU``Vca dcbYbhg`cZU`VcbHJ]bYf`dcfh]b 5i ghfU`]Už`]bWi X]b[`h\Y`fYU`][ba YbhcZh\Y`dcfhUVWYgg`fcUXž'h\Y`XYg][b`cZh\Y`Zccf`Zcf`h\Y`hYfa]bU`žUbX h\Y`XYg][b`cZh\Y`a UVX]bYfmZci bXUh]cbgž'UVWcfX]b[`hc`5i ghfU`]Ub`GHJbXUfXg"

7 ci fgY 5]a g

H\]gʻWcifgYʻU]agʻhcʻdfcj]XYʻghiXYbhgʻk]h\ʻh\Yʻcddcfhib]hnihcʻibXYfhU_YʻdfUWfJWU``Wjj]`Yb[]bYYf]b[ʻdfcYWhg UbXʻhcʻXYjY`cdʻZ]bU``XYhU]`YXʻXYg][bgʻ]bWiX]b[ʻh\Y`dfYdUfUh]cbʻcZkcf_]b[ʻXfUk]b[gʻUbX'dfcYWhifYdcfhg g]a]`Ufʻhcʻh\cgYʻfYei]fYXʻ]bʻdfUWfJWY"

⊧anU]a g`hc`Vi]`X`cb`h\Y`g_]``g`XYjY`cdYX`]b`h\Y`ghiXYbhgfidfYj]ci g`Wj]``Yb[]bYYf]b[`dfU₩jWY`WUggYg"`H\YgY g_]``g`]bWiXY.

- 5b]b!XYdh\ Yb[U[Ya Ybhk]h\ h\YfYYj UbhX]gW]d]bUfm_bck YX[Y]b]hg]bhYf!X]gW]d]bUfmWcbhYl h
- •'7UdUWjhmiZcf'UbU`mhjWU``UbX'WfjhjWU``h\]b_]b[`'UbX'Zcf'WfYUhjj'Y'dfcV`Ya 'gc`j]b[
- •`5V]`]hmhc 'Yb[U[Y`]bXYdYbXYbhUbX 'fYZYWjj Y``YUfb]b[
- •`G_]``g`Zcf`Wc``UVcfUhjjY`UbX`ai`hj!X]gWjd`]bUfmikcf_
- •`G_]``g`Zcf`YZYW1jjY`Wcaaib]WUhjcb

• F YgYUfWX G_]``g

7cifgY'@YUfb]b['CiHWcaYg

 $5\,ZhYf^{\circ}gi~WWggZ~~Mca~d~YhJb[~h,]g^{\circ}Wci~fgYž^{\circ}mci~^g\ci~~X^{\circ}VY^{\circ}UV^{\circ}Y^{\circ}hc.$

@YUfb]b['Ci HWca Y	95 GHJ[Y %7cadYhYbW]Yg	
("`=adfcjY`ghiXYbhgfiWUdUWjhmiZcf`UbU`mhjWU``UbX`Wf]hjWU``h\]b_]b[UbX`dfcV`Ya`gc`j]b[`g_]``g	D9%"%žD9%"&žD9&"' žD9' "'	
)""8YjY`cd`g_]``g`Zcf`Wc``UVcfUhjY`UbX`ai`hj!X]gWjd`]bUfmkcf_`UbX fYgYUfW	D9' "½ D9' "& D9' "*	
*"`5V]`]mrihc`Yb[U[Y`]bXYdYbXYbh'UbX`fYZYWj]jY``YUfb]b[D9%"&žD9%"(žD9'")	

HYUWX]b[GhfUhY[]Yg

H\Y`a U]b`U]a `cZh\Y`Wci fgY`]g`hc`[]j Y`mci `h\Y`cddcfhi b]hmiZcf`gY`ZX]fYWhYX``YUfb]b["`Mci `bYYX`hc`a U_Y XYW]g]cbg`cb`mci f`XYg][b`XUhU`UbX`a Yh\cXc`c[m'`H\Y`Wci fgY`]bj c`j Yg`a i `h]X]gW]d`]bUfmidfc^YWhg`]b`h\Y UfYU`cZW]j]``Yb[]bYYf]b[`k]h\`U`fUb[Y`cZXYg][b`hUg_g"

5 'Zci f!\ci f`dYf]cX`]g`U``cWUhYX`dYf`k YY_`hc`h\Y`Wci fgY"`Hk c`\ci fg`]g`Wca a cb`hc`U```ghi XYbhg`Zcf``YWhi fYg UbX`hk c`\ci fg`Zcf`k cf_g\cdg"`8i f]b[`h\Y`hk c`\ci fg`k cf_g\cdž`ghi XYbhg`k]```k cf_`cb`h\Y`dfc^YWhi bXYf`h\Y [i]XUbWY`cZh\Y`XYa cbghfUhcfg"

@Y₩hifYg

- •'5hh/bX'h\Y'`YWi fYg'hc'_YYd'mci fgY`Zi dXUh/X'cb'h\Y'h/UW\]b['a Uh/f]U`g
- 8]gW gg mci fei Yf]Yg k]h h Y YW fYf
- < YUf Ubbci bWra Ybhg cb Wci fgY W Ub[Yg

K cf_g∖cdg

- GY ZX fy WYX YUfb]b[UbX gc j]b[H\Y dfcV Ya g
- A YYhk]h [fci d'a Ya VYfg UbX XYj Y`cd'ghfUhY []Yg
- 6Y [i]XYX VmXYa cbglfUhcfg
- K cf_ cb XYg][b dfcV Ya g
- 5g_ei Yghjobg

Df]j UhY Ghi Xm

- F Yj]Yk ``YWi fY a UHYf]U`gž'HI H/cc_gž'UbX`gHUbXUfXg
- •'I bXYfghJbX'h\Y'XYg][b'dfcWfgg
- 7 cbXi WhifYgYUfWX cb h Y hcd]W
- •`>c]b`A ccX`Y`X]gW gg]cbg`cZdfcV`Ya g
- Gh XmfY`Yj Ubhgci fWg`UbX`fYZYfYbWg

5ggYgga Ybhg

- •'8Ya cbghfUhY'mci f'_bck `YX[Y'UbX'g_]``g
- •'8Ya cbghfUhY`\][\Yf`i bXYfghUbX]b[`UbX`dfcV`Ya `gc`j]b[
- 8 Ya cbghfuhY i bXYfghUbX]b[cZWcbWYdhXYg][b'UbX'dfcj]XY'Wca d`YhY'XYg][b'gc`i h]cbg

5 HYbXUbWY FYei]fYa Ybhg

Ghi XYbhgʻUfYʻghfcb[`mYbWci fU[YX`hcʻUhhYbX`U```WUggYgʻUbX`fYj]Yk ``YWhi fY`fYWcfX]b[g"

7 ci fgY GWX YXi `Y

J]Yk WUgg'ha YHJV'Y

H]a YHJV`Y'

8 UHY	Hmd Y	7 c bhYbh
C!K YY`+`: YVfi Ufm! %%: YVfi Ufm		
K YY_%%(: YVfi Ufm! % : YVfi Ufm	@YWMifY	@YWnifY'∕'kcf_g\cd.'=bhfcXiWnjcb'⁄'GiV[fUXY 9jU`iUhjcb
K YY_& &%: YVfi Ufm! &) : YVfi Ufm	@YWM fY	@YWMifY'/`kcf_g\cd.`8Yg][b'HfUZZ]W
K YY_'' .`&, ': YVfi Ufm! (`A UfWX	@YWhi fY	@YWMifY'/`kcf_g\cd.'8Yg][b'ZYI]V`Y'dUjYaYbh
K YY_`(.`+`A UfWX`!`%% A UfWX	@YWMifY	@YWnifY'/`kcf_g\cd.'8Yg][b'ZYI]V`Y'dUjYaYbh f17cbhfXt:!`=bhfcXiWn]cb'hc'GcZnkUfY'7]fWm
K YY_`).`%(`A UfWX`!`% A UfWX	@YWhi fY	@YWMifY'/`kcf_g\cd.'8Yg][b`]bXigHf]U`'Zccf'Zcf'h\Y dcfh
K YY_`*.`&%`A UfWX`!`&) A UfWX		

FYgci fWg

DfYgWf]VYX F Ygci fWyg

AccX`Y.

A UHYf]U`g`]bWi X]b[`WUgg`UbX`XYa cbgHUHjcb``]b_gž`YWi fY`bcHYgždfcYWiXYgWf]dHjcbž'Z]Y`X`UbX``UVcfUhcfm HYghXUHJžUbX`HfUZZ]WXUHJ`k]``VY`dfcj]XYX`H\fci[\`A ccX`Y"

FYZYfYbWYg.

! 5i ghfcUXg.; i]XY hc DUj Ya YbhHYW bc c[mDUfh & DUj Ya YbhGhfi Wi fu 8Yg][b

!'; i]XY'hc`≢oXighf]U`': `ccfg'UbX'DUj Ya Ybhg'!'8Yg][bž'7cbghfiWh]cb'UbX'GdYW]2]WUh]cbž'7Ya Ybh7cbWfYhY UbX'5[[fY[UhYg'5ighfU`]U

! Df]bW]d`Yg`cZgc]``XmbUa]Wg"`8Ug`6A žFUa UbU`; J ž7Yb[U[Y`@YUfb]b[/&\$%*"

FYWca a YbXYX FYgci fWYg

!`DUj Ya YbhUbU`mg]g`UbX`XYg][bž<i Ub[ž`M'<"ž`&\$\$("

!'6ck `Ygž>"9"': ci bXUh]cb`5bU`mg]g`UbX`8Yg][bžA W fUk !<]``

7ci fgY'9j U`i Uh]cb'UbX'8Yj Y`cda Ybh

H\Y'WcifgY']g'fYj]Yk YX'UbbiU``miN fci[\`h\Y'a m91 dYf]YbWY'gifjYm''5```fYgdcbgYg'UfY'Wcbg]XYfYX'UbX k Y'a U_Y'WXUb[Yg'hc'h\Y'WcifgY'UbbiU``mi]b'fYgdcbgY"'K Y'UfY'U`gc'U`k Umg`\Uddmhc'[YhZYYXVUW_'Xif]b[h\Y'WcifgY'Zcf']a a YX]UhY'Wcbg]XYfUh]cb"

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

D`YUgY`fYZYf`hc`h\Y`A ccX`Y`dU[Y`cZh\Y`Wci fgY`Zcf`Z fh\Yf`[i]XUbWY`cb`UggYgga Ybhigi Va]gg]cb"

I BGK `\Ug`U`gHUbXUfX``UhY`gi Va]gg]cb`dYbU`hmcZ

)ı 'dYf'XUmž'Zcf'U``UggYgga Ybhg'k \YfY'U'dYbU`hm'Udd`]Ygž'WUddYX'Uh'Z]j Y'XUmg'f%&\$'\ci fgŁz'UZYf k \]W\'U'ghi XYbh'WUbbchigi Va]h'Ub'UggYgga Ybhž'UbX'bc'dYfa]hhYX'j Uf]Uh]cb"

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

6Yk UfY**5b*Ugg][ba Ybhih Uhi]bWi XYg*d*U[]Uf]gYX*a UhYf]U**k]***fYWY]j Y*U*\$i ** U]*žUbX*ghi XYbhg*k \c d*U[]Uf]gY*a UmZJ]**h\Y*Wci fgY**Ghi XYbhg*k \c*d*U[]Uf]gY*UfY*U*gc**]UV*Y*hc*X]gW]d*]bUfmUWf]cbž]bWi X]b[YI Wi g]cb*Zfca *Ybfc*a Ybh

D`U[]Uf]ga `]g`h\Y`i gY`cZUbch\Yf`dYfgcb'g`k cf_`cf`]XYUg`Ug`]Zh\Ymk YfY`mci f`ck b"`K \Yb`]h`]g`bYWfggUfmcf XYg]fUV`Y`hc`i gY`ch\Yf`dYcd`Y'g`a UhYf]U``mci `g\ci `X`UXYei UhY`mUV_bck `YX[Y`k \cgY`k cfXg`cf`]XYUg`h\Ym UfY`UbX`k \YfY`mci `Zci bX`h\Ya `f[]j]b[`h\Y`Wca d`YhY`fYZYfYbWf`XYhU]`gž`]bWi X]b[`dU[Y`bi a VYffgŁ"`H\Y @YUfb]b[`7YbhfY`dfcj]XYg`Z fh\Yf`]bZcfa Uh]cb`cb`k \UhWcbgh]hi hYg`D`U[]Uf]ga `Uh

5WUXYa]W=bZcfaUh]cb

:]bU``9I Ua]bUh]cbg.

:]bU`YI Ua g`]b`H%&\$&&`k]``VY`\Y`X`cb`]bY`VYfk YYb`&-f\`5df]``!`%&f\`A Um`]bWi g]j Yž'UbX`gi dd`Ya YbfUfm YI Ua g`VYfk YYb`&' fX`!`&+f\`A Um`]bWi g]j Y"`Nci `UfY`fYei]fYX`fc`VY`Uj U]`UV`Y`cb`f\YgY`XUfYg"`D`YUgY`Xc bchifc`a U_Y`UbmidYfgcbU``cf`ffUj Y``UffUb[Ya Ybfg`Xi f]b[`f\]g`dYf]cX"'

57589A = 7 58J = 79

- ? YmiGhUZhc 7 cbhUWiZcf 5 WUXYa]W5Xj]WY flc[']b'k]h mci f'n=8 'UbX dUggk cfXŁ <u>htdg.#bhUbYhWj Yb['i bgk "YXi "Ui # YmlghUZhc!WcbhUWiXi f]b[!mci f!ghi X]Yg!Uhi bgk ``</u>
- <u>? Ymil BGK '8 Uh/g</u>! Y["'7 Ybgi g'8 Uh/žYI Ua 'XUh/gž`UghXUmhc 'Xfcd'U'Wci fgY'k]h\ci h UWUXYa]\#]bUbW[U```]UV]`]hmiYhW'
- 7 J 9B 'Gh XYbh = bh UbYh flc [']b k]h 'mci f'n=8 'UbX dUggk cfXŁ '<u>hhdg.#bh UbYh Wj Yb["i bgk "YXi "Ui #gh XYbh]bh UbYh</u>'
- Gh XYbh@]ZY Uh7 J 9Bž]bWi X]b[`Gh XYbh GcW]Yh]Yg. \http://
- GdYWJU``7cbg]XYfUHjcb.`<u>\htdg.##ghiXYbh'i bgk "YXi "Ui #gdYWJU`!Wcbg]XYfUHjcb</u>`

5ddYbX]I. '9b[]bYYfg'5ighfU`]U'f195ŁDfcZYgg]cbU`'9b[]bYYf'7cadYhYbWm GHJbXUfX

Dfc[fUa +bhybXYX @YUfb]b[Cihwca Yq ? bck `YX[Y 'UbX'q_]``'VUqY D9%"%7cadfY\Ybq]iYžh\YcfmVUqYXibXYfqHUbX]b[cZh\YibXYfd]bb]b[bUhifU`UbX d/mg]WU`:gW]YbWYg`UbX`h\Y`Yb[]bYYf]b[`Z bXUa YbHU`g`Udd`]WUV`Y`hc`h\Y`Yb[]bYYf]b[`X]gW]d`]bY D9%"& 7 cbW/dhiU`i bXYfqHUbX]b[cZh\Y`a Uh\Ya Uh\Wažbi a Yf]WU`UbU`mg]qžqHUh|qh\WažUbX Weadi hYf'UbX']bZcfaUh]cb'gW]YbWYg'k\]WX'i bXYfd]b'h\Y'Yb[]bYYf]b['X]gW[d`]bY D9%" + + XYdh i bXYfqHbX]b[cZqdYWU`]qhVcX]YqcZ bck YX[Yk]h bhY'Yb[]bYYf]b[X]qWd`]bY D9%"('8]qWFfba YbhcZ_bck YX[YXY]Ycda YbhUbXfYqYUfWXX]fYWfcbg'k]h.jb'h.Y Yb[]bYYf]b[`X]gWJd`]bY D9%") ? bck `YX[Y`cZYb[]bYYf]b[`XYg][b`dfUW]WY`UbX`WcbhYl hi U``ZJW/cfg`]a dUWf]b[`h\Y Yb[]bYYf]b['X]qW[d`]bY D9%"* I bXYfqHJbX]b[cZh\Y'qWcdYždf]bW]dYgžbcfa gžUWVci bHJV]]]h]Yg'UbX'Vci bXg'cZ qi qHU]bUV`Y`Yb[]bYYf]b[`dfUWf\WY`]b`H\Y`qdYW[Z]WX]qW[d`]bY 9b[]bYYf]b['Udd`]WUhcb'UV]`]hm D9&"%5dd`]WUhjcb`cZYghUV`]g\YX'Yb[]bYYf]b[`a Yh\cXg`hc`Wca d`YI 'Yb[]bYYf]b[`dfcV`Ya qc`i]b[D9&"&: `i YbhUdd`]WUhcb'cZYb[]bYYf]b['hYWkb]ei Ygžhcc`g'UbX'fYgci fWfg D9&"' 5dd`]WUhjcb'cZgmghYa UhjWYb[]bYYf]b['gmbh\Yg]g'UbX'XYg][b'dfcWYggYg D9&"('5dd`]WUHcb'cZgmghYa UHWUddfcUWXYg'hc'h\Y'WcbXi WiUbX'a UbU[Ya YbhcZYb[]bYYf]b[dfc Y₩q DfcZYgg]cbU`UbX dYfgcbU`Uhf]Vi hYg D9' "%'9h\]WU``WcbXi WiUbX'dfcZygg]cbU``UVWci bHUV]`]hm D9' "&'9ZYW) Y'cfU`'UbX'k f)HYb'Wca a i b)WU) cb']b'dfcZygq]cbU`'UbX'`UmXca U]bg D9' "' 7 fYUhi Yžibbci Uhi YUbX dfc!UWi YXYa YUbci f D9' "('DfcZygg]cbU``i gY'UbX'a UbU[Ya YbhcZ]bZcfa Uhcb D9' ") CfXYfma UbU[Ya YbhcZgYZzUbX dfcZygq]cbU`WcbXi Wh D9' "* 9ZYWAJ Y HYUa 'a Ya VYfg\]d UbX HYUa 'YUXYfg\]d