# **CVEN9820**

## 7 ca di huhjcbu``Ghfi Whi fu``A YVXUb]Wg



eba

CVEN9820 // Term 1, 2022 // published at 09-02-2022 © UNSW Sydney, 2022

## 7 ci fgY<sup>-</sup>Cj Yfj ]Yk

## GHJZZ7cbHJWh78YHJ]`g

#### 7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cWUhjcb	D\cbY
7\cb[a]b <sup>-</sup> Gcb[	<u>Wgcb[4 i bgk "YXi "Ui</u>	Hi YgXUm&!(DA ∕ H∖i fgXUm&!(DA	79+%+6	))\$&%

#### @Y₩ni fYfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cWUhjcb	D\cbY
7\cb[a]b <sup>-</sup> Gcb[	<u>Wgcb[4 i bgk "YXi "Ui</u>	Hi YgXUm&!(DA ∕ H∖i fgXUm&!(DA	79+%+6	))\$&%

## GWXcc``7cbHJWhi=bZcfaUh]cb

<u>9b[]bYYf]b[\_`Gh XYbhGi ddcfhGYfj]WYg</u>`-'H\Y`Bi WYi g`!`Ybfc`a Ybhždfc[fYgg]cb`W\YW\_gžWUg\`fYei Yghgž Vći fgY`]ggi Yg`cf`dfc[fUa !fY`UhYX`ei Yf]Yg`

<u>9b[]bYYf]b[`⊕Xi ghf]U``HfU]b]b[</u>\_-`⊕Xi ghf]U``hfU]b]b[`ei Ygh]cbg`

<u>I BGK 'Gh Xm5VfcUX</u>'-gh XmUVfcUX'gh XYbhYbei ]f]Yg'fZcf']bVci bX'gh XYbhgŁ'

I BGK '9I W.Ub[Y'-ghi XYbhYI W.Ub[Y'Ybei]f]Yg'fZcf']bVci bX'ghi XYbhgŁ

I BGK : i h fY'Gh XYbhg - dchYbhJU' gh XYbhYbei ]f]Yg'Y"["'UXa ]gg]cbgž'ZYYgž'dfc[ fUa gž'WfYX]h'hfUbgZ'f"

#### D\cbY'

fŽ\*%'&Ł'-',)',)\$\$`-BiWYig'GhiXYbh'<iV'

fŽ\*%<sup>•</sup>&Ł'-',)`+\*\*%<sup>•</sup>−<sup>•</sup>9b[]bYYf]b[`⊕Xi ghf]U``HfU]b]b[`

fŽ\*%`&Ł'-',)`'%+-`<mark>-</mark>`IBGK `GhiXm5VfcUX`UbX`IBGK `9IWXUb[Y`fZcf`]bVcibX`ghiXYbhgŁ`

### 5XX]h]cbU`7cifgY`=bZcfaUh]cb

Mci 'k ]```ghi Xma cXYfb`bi a Yf]WU``a Yh\cXg`UbX'h\Y]f`Udd`]WUh]cbg`hc`ghfi Wi fYg`UbX'ch\Yf`W]j ]``Yb[ ]bYYf]b[ dfcV`Ya g`Vmih\Y`i gY`cZWca a YfW]U``Z]b]HY`Y`Ya YbhigcZhk UfY'''H\Y`UWei ]fYX`\_bck `YX[ Y`]g`Udd`]WUV`Y`hc`h\Y UbU`mg]g`UbX`XYg][ b`cZa UbmimdYg`cZW]j ]``Yb[ ]bYYf]b[ `Wcbghfi Wh]cbg`gi W\`Ug`Vi ]`X]b[ gž`Zci bXUh]cbgž XUa gž`YhW`Nci `UfY`YI dYWhYX'hc`VY`ZJa ]`]Uf`k ]h`h\Y`h\Ycf]Yg`UbX`WcbWidhg`]bhfcXi WYX`]b`h\Y`dfYj ]ci g ghfi Wi fU``Yb[]bYYf]b[ `Wci fgYg'''H\]g`Wci fgY``Umg`h\Y`Zci bXUh]cbz`Zcf`]b!XYdh\`ghi Xmcb`h\Y`bi a Yf]WU` g]a i`Uh]cbž'k \]W\`]g`U`fUd]X`mYj c`j ]b[ `UbX`a i`h]!X]gW]d`]bUfmZ]Y`X'''H\Y`a UhYf]U``Wcj YfYX`]b`h\]g`Wci fgY`]g YggYbh]U``]b`a cXYfb`ghfi Wi fU``UbU`mg]g`UbX`XYg][ b"



5 a Uf\_'cZUh`YUgh'(\$i `]b'h\Y`ZbU``YI Ua ]bUh]cb`]g`fYei ]fYX`VYZcfY`h\Y`WUgg`k cf\_`]g`]bWi XYX`]b'h\Y`ZbU` a Uf\_"

## 5HYbXUbWYFYei]fYaYbhg

Ghi XYbhgʻUfYʻghfcb[`mʻYbWci fU[YX'hcʻUhhYbX'U```WUggYgʻUbX'fYj]Yk ``YWhi fYʻfYWcfX]b[g"

## 7 ci fgY GWX YXi `Y

## J]Yk WUgg'ha YHJV`Y

## H]a YHJV`Y'

8 UhY	Hmd Y	7 c bhY bh	
K YY_'% %( ': YVfi Ufm! % ': YVfi Ufm	@YWMifY	=bHfcXiWhjcb"`AUH∖YaUhjWU``acXY``]b[`cZX]ZIg]cb. @Ud`UWY`YeiUhjcb`UbX`VcibXUfmWcbX]hjcbg"`:]b]hY! Y`YaYbhaYh\cX`Zcf`%8`dchYbhjU``dfcV`Ya`—`g\UdY ZibWhjcbg`UbX`Y`YaYbhighjZZoYgg`aUhf]I"	
K YY_`&`&%: YVfi Ufm! &)`: YVfi Ufm	@YWMifY	: ]b]hY!Y`Ya Ybha Yh\cX`Zcf`%8`dchYbh]U``dfcV`Ya fl g]b[`gYYdU[Y`Zck`Ug`YI Ua d`YŁ'–`UggYa V`mcZ [`cVU``gh]ZbYgg`a Uhf]I ž`Vci bXUfmWcbX]h]cbg`UbX gc`i h]cbg": ]b]hY`Y`Ya YbhUbU`mg]g`cZgdf]b[`UbX VUf`gmghYa g"	
	K cf_g\cd	5g <sup>-</sup> UVcj Y	
K YY_'' .`&, ': YVfi Ufm! (`A UfVX	@YWhifY	Hf]Ub[i`Uf`Y`YaYbhg"`5ggYaV`mcZ[`cVU``gh]ZbYgg aUhf]IžVcibXUfmWcbX]h]cbg`UbX`gc`ih]cbg" =bhfcXiWh]cb`hc`dfc[fUaa]b[`Z]b]hY`Y`YaYbh UbU`mg]g`ig]b[`A5H@56"	
	K cf_g\cd	5g <sup>·</sup> UVcj Y"	
K YY_`(.`+`A UfVX`!`%% A UfVX	@YWMifY	H\YcfmcZY`Ugh]W]Imi—`GhfYgg`j Yfgi g`ghfU]b``Uk g UbX`Vci bXUfmWcbX]h]cbg"`9bYf[ ma Yh\cXg. Gdf]b[ `UbX`VUf`Y`Ya Ybhg`UbX`VYUa `Y`Ya Ybhg"	
	K cf_g\cd	5g <sup>-</sup> UVcj Y"	
	5ggYgga Ybh	Ei]n'%	
K YY_`)."%(	@YWhifY	=blfcXiWfjcbihciUWca a YfWjU`iZjb]hY!Y`Ya Ybh dfc[fUa`i5BGMG.iZfUa YiUbU`mg]g"i7cbgHJbhghfU]i hf]Ub[i`UfiYiYa Ybhg"	
	@UVcfUhcfm	7 ca di hYf`@UV`gYgg]cb`cb`dfc[fUa a ]b[`Z]b]hY Y`Ya YbhUbU`mg]g`i g]b[`A 5H@56`UbX`ZfUa Y UbU`mg]g"	
	5ggYgga Ybh	5gg][ ba YbhgYh	
K YY_`*.`&%`A UfVX`!`&) A UfVX	@YWhifY	:`YI]V]`]hmik YY_'Zcf'U``WcifgYg'fbcb!hYUWX]b[Ł	
K_YY_`+.`&, `A_UfWX`!`%	@YWhifY	A cXY``]b[ `]ggi Yg`]b`Z]b]hY`Y`Ya Ybha Yh\cX"	

## FYgci fWfg

## FYWca a YbXYX FYgci fWYg

#### 7CIFG9"A5H9F=5@G"

H\Y`WcifgY`aUhYf]U`g`Wcbg]ghcZ

- @YWMifY`bchYg`dfcj]XYX`cb`gY`YWMYX`hcd]Vgž
- ? fUb\`>"`f&\$\$( Łź"GlfYgg`UbX`8YZcfa Uhjcb`A cXY`]b[`k]h\`G≑ A 5₩ .`5b`9b[]bYYf]b[ A Yh\cXc`c[m]Ž; Yc!G`cdY`=bhYfbUhjcbU``@hX`fUj U]`UV`Y`Ug`D8: `Ź]`YŁ"
- K cf\_g\cd`YI Ua d`Yg`cZ5BGMG"

Cb`]bY`aUbiU`gžYb[]bYYf]b[`aYh\cXc`c[mVcc\_g`f?fUb\`>"`&\$\$(EUbX`UXX]h]cbU``kcf\_g\cd`YLUad`Yg`cZ 5BGMG`WUb`VY`j]YkYX`UbX`df]bhYX`X]fYWimiZica`h\Y`gcZkUfY"

#### 588**+**H€B5@F958**=**B;G

• @c[Ubž8"`@'`f&\$%%{z``5`: ]fghi7ci fgY`]b`h\Y`: ]b]hY`9`Ya YbhA Yh\cX"z`6fcc\_g#7c`Yz`) h\`YX]h]cb" Df]bh`

## 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'miUdd`]Ygž'WUddYX'Uh'Z]j Y'XUmg'f%&\$'\ci fgŁz'UZhYf k \]W\'U'ghi XYbh'WUbbchigi Va ]hUb'UggYgga Ybhž'UbX'bc'dYfa ]hhYX'j Uf]Uh]cb"

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

6Yk UfY\*\*5b\*Ugg][ba Ybhh\Uh]bWi XYg\*d\*U[]Uf]gYX\*a UhYf]U\*\*k]\*\*\*fYWY]jY\*U\*\$i=\*\*\*U]\*žUbX\*ghi XYbhg\*k \c d\*U[]Uf]gY\*a UmZu]\*\*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`bYWyggUfmcf XYg]fUV`Y`hc`i gY`ch\Yf`dYcd`Y'g`a UhYf]U``mci `g\ci `X`UXYei UhY`mUW\_bck `YX[Y`k \cgY`k cfXg`cf`]XYUg`h\Ym

## 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'f95EDfcZYgg]cbU`'9b[]bYYf'7cadYhYbWm GHJbXUfX

Dfc[fUa +bhybXYX @YUfb]b[ Cihwca Yq ? bck `YX[ Y 'UbX'q\_]``'VUqY D9%"%7ca dfY\Ybq]i Yž'h\YcfmVUqYX'i bXYfqHUbX]b[ 'cZh\Y'i bXYfd]bb]b[ 'bUhi fU`'UbX  $d mg]WU^{g}UbX'hY'Yb[]bYYf]b['Z bXUa YbHU^{g}Udd^WUVY'hc'hY'Yb[]bYYf]b['X]gW[d^bY$ D9%"&'7cbW/dhU`ibXYfqHJbX]b['cZh\Y'aUh\YaUhWažbiaYf]WU`UbU`mq]qžqHJhjqhWqžUbX Wca di hYf'UbX']bZcfa Uh]cb'qWYbWYg'k \]WX'i bXYfd]b'h\Y'Yb[]bYYf]b['X]qW[d`]bY D9%" ===!XYdh\ i bXYfqHbX]b[ cZqdYWU`]qhVcX]YqcZ bck YX[Yk]h\]b'h\YYb[]bYYf]b[ X]gWjd`]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]qWd`]bY D9%"\* 1 bXYfqHJbX]b[ 'cZhXY'qWcdYž'df]bW]d`Yqž'bcfa qž'UWVci bHJV]`]h]Yq'UbX'Vci bXq'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\YXYb[]bYYf]b[`a Yh\cXg`hc`Wca d`YI Yb[]bYYf]b[`dfcV`Ya qc`i]b[ D9&"&: `i YbhUdd`]WUhjcb'cZYb[]bYYf]b[ 'hYWkb]ei Yqžhcc`q'UbX'fYqci fWfq D9&"' 5dd`]WUHcb'cZgmgHYaUHWYb[]bYYf]b['gmbH,Yg]g'UbX'XYg][b'dfcWyggYg