# **CVEN4102**

## CdYfUhjcbg⁻UbX⁻Dfc↑Y₩g



CVEN4102 // Term 1, 2022 // published at 17-02-2022 © UNSW Sydney, 2022

VFl

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

### GHJZZ7cbHJWh78YHJ]`g

#### 7cbj Ybcfg

BUa Y	9a U]`	5j U]`UV]`]hm	@cWUh]cb	D∖cbY
8f`>c\bgcb`G\Yb	<u>I "g\Yb4 i bgk "YXi "Ui</u>	5j U]`UV`Y`Xi f]b[ `YWfi fYg`UbX Wcbgi `HUf]cb gYgg]cbgžcf`9a U]` hc`a U_Y Uddc]bha Ybhcb Ubmi f[Ybhcf dYfgcbU``a UffYfg	7 ]j ]` 9b[ ]bYYf]b[ 6i ]`X]b[ fk &\$E@Yj Y` &žFcca `&%& ? Ybg]b[ hcb 7 Ua di g	Ž*‰-',)\$ (,'

### GWXcc``7cbHJWhi=bZcfaUhjcb

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

<u>9b[]bYYf]b[ \*ŧXi ghf]U``HfU]b]b[</u> - ŧXi 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'

<u>IBGK '91 W.Ub[Y</u>'-'ghi XYbhYI W.Ub[Y'Ybei ]f]Yg'fZcf']bVci bX'ghi XYbhgŁ'

<u>IBGK : i h fY`Gh XYbhg</u>`-`dchYbh]U``gh XYbhYbei ]f]Yg`Y"["'UXa ]gg]cbgž`ZYYgždfc[ fUa gž`WfYX]hhfUbgZYf`

### D\cbY'

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

fŽ\*%\*&&-'-',)`+\*\*%`**-**`9b[]bYYf]b[`=bXi ghf]U``HfU]b]b[`

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

## 7cifgY<sup>·</sup>8YHJ]`g

### I b]hg`cZ`7fYX]h`\*`

### Gi a a UfmcZh\Y'7 ci fgY

H\]gʻWcifgY`]gʻXYg][bYX'hc`YI HYbX'mcif`\_bck`YX[Y'cb'WcbgHfiWf]cb'aYH\cXgžYb[]bYYf]b[`XYg][b'UbX cdYfUH]cbg'd`Ubb]b["``+iWcjYfg'h\fYY'WUHY[cf]YgʻcZcdYfUH]cbg.`\YUjmWJj]`WcbgHfiWf]cbžVi]`X]b[ WcbgHfiWf]cbž'UbX`ibXYf[fcibX`]bZfUgHfiWfifY'WcbgHfiWf]cb"`'9IUad`Ygʻk]``VY`[]jYb'hc`]bHfcXiWYXYg][b h\YcfmUbX'VYghdfUWf]Wf`]b'Yb[]bYYf]b[`WcbgHfiWf]cbžgiW\'Ug`\ck`hc`]adfcjY'h\Y'dfcXiWfj]hm]b YUfh\acj]b[ž'\ck`hc`XYg][b'U'WcbWfYhY'Zcfakcf\_ž'UbX`\ck`hc`]bghU```U`ih]`]mhibbY``k]h\cihcdYb]b[`id h\Y`[fcibX''`5hh\Y`YbX`cZh\Y'WcifgYžmci'k]``\UjY'U'VYHYf`ibXYfgHUbX]b[`UVcihU'jUf]YmcZ WcbgHfiWf]cb'dfcWfggYgždfUWf]WU`Yb[]bYYf]b[`XYg][b'UbX`gHUHY!cZh\Y!UfhWcbgHfiWf]cb'HYW.b]eiYg"

### 7 ci fgY 5]a g

H\Y`U]a `cZh\]g`Wci fgY`]g`hc`]bhfcXi WY`ghi XYbhg`hc.

- I bXYfgHUbX'U'j Uf]YhmcZWcbgHfi Whjcb'dfcWlggYg'UbX'a Yh\cXg/
- =XYbh]Zmih,Y`\_YmZJWcfg`UXcdhYX`]b`h,Y`XYg][b`cZdYfa UbYbhcf`hYa dcfUfmighfi Wi fYg/
- Dfcj ]XY mci 'k ]h. dfcWXi fYg UbX hcc`g Zcf Yb[ ]bYYf]b[ 'XYg][ b"

### 7cifgY`@YUfb]b[`CiHWcaYg

5ZhYfigi VWVggZ ``mWcad`Yhjb[ h\]giWcifgYžmci ig\ci `XiVYiUV`Yihc.

@YUfb]b[`CiHWcaY	95 GHJ[Y %7ca dYhYbW]Yg
%"`9Id`U]b`h\Y`dfcWfgg`cZWcbghfiWf]cb`cdYfUh]cbg	D9%"%ž`D9' "&ž`D9' "*
&""K cf_`]bXYdYbXYbhmcb"h\Y"XYg][b"U"dYfa UbYbhcf"hYa dcfUfm ghfi Whi fY	D9%") žD9&"%žD9&"&
'"GY`YWhU`gi]HUV`Y`aYh\cX`Zcf`WcbghfiWh]b[`ibXYf[fcibX`hibbY`g"	D9%"* ž <sup>`</sup> D9&"&ž <sup>`</sup> D9&"'

### HYUWX]b[ GhfUhY[]Yg

@YWMifYg.': ]bX'cihk\Uhmci aigh`YUfbž: c``ck k cf\_YX'YIUad`Ygž<YUf`UbbcibWfaYbhg`cb`WcifgY VXUb[Yg"

K cf\_g\cdg. 6Y [i]XYX VmXYa cbgHU

‰

‰

UVci hk \Uhmci 'gYY'Xi f]b[ 'h\Y'k cf\_g\cdg"

; i Ygh@YWi fY.`<YUf`k \Uh'UWi U``m`\UddYbg`]b`WcbgHi Wi]cb`g]hYg`Zica `dfUWi]h]cbYfg"

### 5XX]h]cbU`7ci fgY = 5Zcfa Uh]cb

DfY!fYei]g]hYg'Zcf'lbXYf[fUXiUhY'ghiXYbhg.'7J9B&%%%9b[]bYYf]b['7cbghfiWh]cb/7J9B'%%%9b[]bYYf]b['CdYfUh]cbg'UbX'7cbhfc`"

91 Wi XYX'7 ci fgY'Zcf'Dcgh[ fUXi UhY'ghi XYbhg.'7 J 9B - +&' '8Yg][ b'cZ7cbghfi Wh]cb'CdYfUh]c]bg"

## 5ggYgga Ybh

5ggYgga Ybh'HJg_	K Y][∖h	8iY`8UHY	

## 5HYbXUbWFFYei]fYaYbhg

I		1

### FYgci fWg

### DfYgWf]VYX F Ygci fWfg

 $H \ YfY \ g \ bc \ dfYgW \ W \ W \ H \ W \ c \ Zc \ f \ h \ g \ W \ i \ fgY \ "$ 

### FYWca a YbXYX<sup>-</sup>FYgci fWYg

H\YfY'UfY'bi a Yfci g'Vcc\_g']b'h\Y``]VfUfm'Wcj Yf]b['7cbgHi Wf]cb'A Yh\cXg'UbX'Dfc'YWiA UbU[Ya YbH'``=Z mci 'UfY'\Uj ]b['Hfci V`Y'Zc``ck ]b['h\Y``YWi fYg'cf'i bXYfgHUbX]b['\ck 'U'WcbgHi Wf]cb'dfcW/gg'k cf\_g'h\Yb']h ]g'fYWca a YbXYX'h\Uhmci ``cc\_'UhcbY'cZh\YgY''

## 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 Ybhih.Uhi]bWi XYg`d`U[ ]Uf]gYX`a UhYf]U``k ]```fYWY]j Y`U`\$ı -`: U]`ž'UbX`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'f\Y`i gY`cZUbch\Yf`dYfgcb'g'k cf\_`cf`]XYUgʻUg`]Zh\Ymk YfY`mci f`ck b"`K \Yb`]h]gʻbYWfggUfmcf XYg]fUV`Y`fc`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`]XYUgʻh\Ym UfY`UbX`k \YfY`mci `Zci bX`h\Ya `f[]j ]b[`f\Y`Wca d`YhY`fYZYfYbWf`XYhU]`gž`]bWi X]b[`dU[Y`bi a VYffgŁ"`H\Y @YUfb]b[`7YbffY`dfcj]XYgʻZ fh\Yf`]bZcfa Uh]cb`cb`k \UhWcbgh]hi hYg`D`U[]Uf]ga `Uh

<u>\hdg.##qhi XYbh"i bgk "YXi "Ui #d`U[]Uf]ga</u>

### 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"`Mci `UfY`fYei ]fYX`fc`VY`Uj U]`UV`Y`cb`f\YgY`XUfYg"`D`YUgY`Xc bchfc`a U\_Y`UbmdYfgcbU``cf`ffUj Y``UffUb[ Ya Ybfg`Xi f]b[`f\]g`dYf]cX"'

#### 57589A = 758J = 79

? YmiGHJZzhc '7 cbHJWhiZcf '5 WJXYa ]W5 Xj ]WY flc[ ']b k ]h mci f n=8 'UbX dUggk cfXŁ '

## 5ddYbX]I. '9b[]bYYfg'5ighfU`]U'f195EDfcZYgg]cbU`'9b[]bYYf'7cadYhYbWm GHJbXUfX

Dfc[fUa ėbhYbXYX @YUfb]b[ ℃ihWcaYg	
?bck`YX[Y`UbX`g_]``VUgY	
D9%"%"7cadfY\Ybg]jYžh\YcfmVUgYX"ibXYfgHUbX]b["cZh\Y"ibXYfd]bb]b["bUhifU`"UbX d\mg]WU`"gW]YbWYg"UbX"h\Y"Yb[]bYYf]b["ZibXUaYbHU`g"Udd`]WUV`Y"hc"h\Y"Yb[]bYYf]b["X]gW]d`]bY	
D9%"&`7cbWYdhiU``ibXYfgHUbX]b[`cZh\Y`aUh\YaUh]VgjžbiaYf]WU``UbU`mg]gžgHUh]gh]VgjžUbX WcadihYf`UbX`]bZcfaUh]cb`gW]YbVW`g`k\]VX`ibXYfd]b`h\Y`Yb[]bYYf]b[`X]gW]d`]bY	
D9%" `=b!XYdh\`i bXYfgHUbX]b[`cZgdYW]U`]ghVcX]Yg`cZ`_bck`YX[Y`k]h\]b`h\Y`Yb[]bYYf]b[ X]gW]d`]bY	
D9%"(`8]gWYfba YbhcZ_bck`YX[Y`XYjY`cda YbhUbX`fYgYUfW\`X]fYWfjcbg`k]h\]b`h\Y Yb[]bYYf]b[`X]gWjd`]bY	
D9%)`?bck`YX[Y`cZYb[]bYYf]b[`XYg][b`dfUWf]WY`UbX`WcbHYIhiU``ZUWrcfg`]adUWf]b[`H\Y Yb[]bYYf]b[`X]gW]d`]bY	