

Department of Computing

**Graduate Diploma in Information and Communication Technologies
Bachelor of Information and Communication Technologies
Diploma in Information and Communications Technology**

BCSE101 – Software Engineering 1A

Programming Assignment

Semester Two 2017

Due date: Fri 29 September

Time: 5.00 pm

SECTION	MARKS
A	5
B	5
C	5
D	5
E	<u>30</u>
Total	<u>50</u>

Student Name/ID

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Submissions received late will be subject to a penalty of 10% of the student's mark per working day.

This assignment is worth 10% of the total marks for BCSE101.

This paper has sixteen (16) pages including the cover sheet.



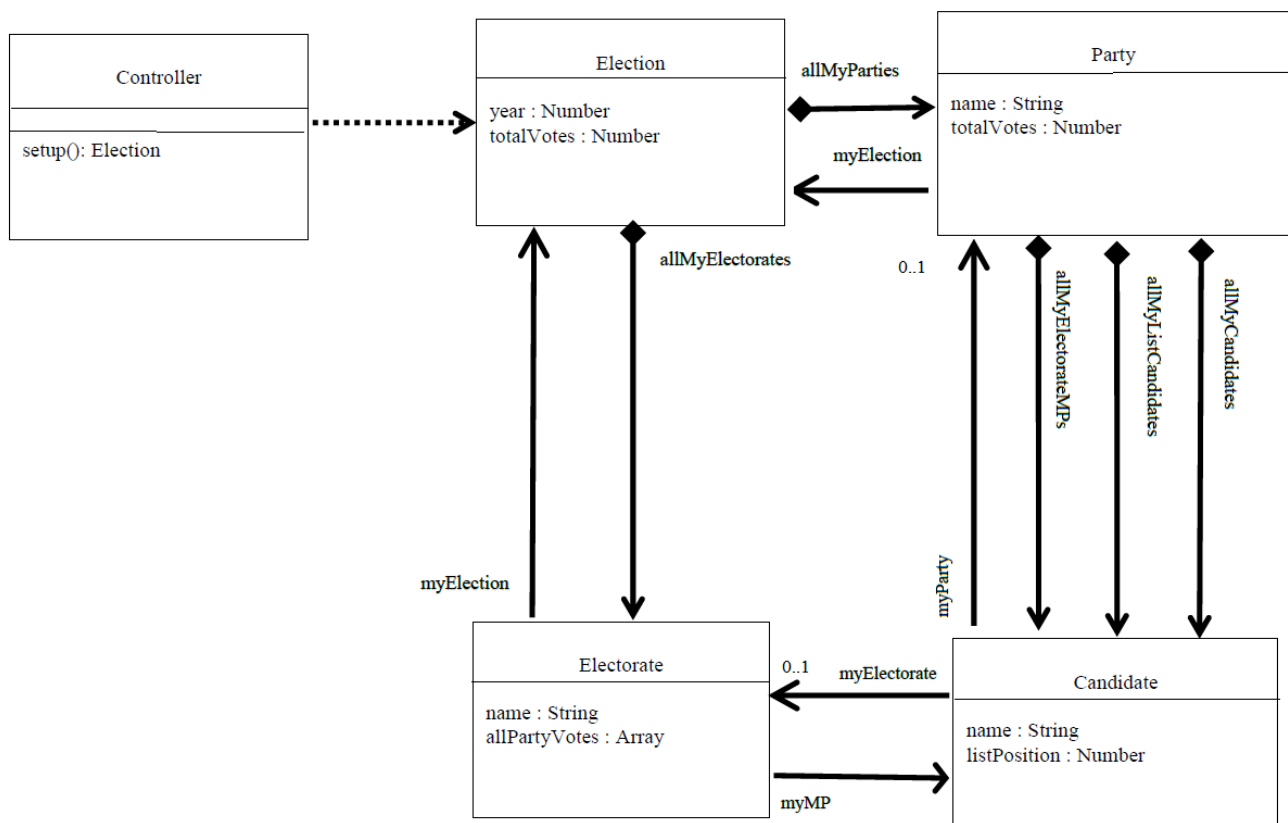
Assignment Description

The purpose of this assignment is to build part of a system that would ultimately be used by the Electoral Commission to determine the number of seats in Parliament.

In your LAB CLASS you will draw a class diagram of the system implied by the Controller.js class. This system is based on the <<WHOLE>> <<PART>> pattern that you have coded with exercises creating Toybox-Toy and ChocolateBox-Chocolate.

Notes:

- Where you are asked to write a method, you may need to write more than one 'supporting' methods.
- This is a partial system. At the end of this assignment, once you have handed in your work, you will be given a model answer. That will be the basis for the **next** assignment which will add more details to what you have to do for this first assignment. Think of this assignment as 'iteration 1' of the building of a larger system.



Test Data

The following code should be used to load your test data.

THIS IS AVAILABLE AS A FILE (Controller.js) ON Moodle.

```
class Controller {
  static setup () {
    /* all data from
     * http://archive.electionresults.govt.nz/electionresults_2011/e9/html/statistics.html
     */
    var theElection = new Election(2014)
    var aParty, anElectorate
    // parties AND Party Lists of successful parties
    aParty = theElection.addParty('ACT New Zealand')
    aParty.addListCandidates('WHYTE, Jamie Thomas'
      , 'WANG, Kenneth Xiaoxuan'
      , 'GRIEVE, Robin Barrie'
      , 'HOULBROOKE, Beth Patricia'
      , 'NICOLSON, Donald Owen'
      , 'BERRY, Stephen James'
      , 'KOVALENKO, Daria Alexeevna'
      , 'VEALE, Gareth Rhys'
      , 'CUMMINGS, Ian James'
      , 'RUSSELL-MUTI, Sara Jane'
      , 'SEVERIN, Toni Gae'
      , 'PIRRIE, Phelan Michael'
      , 'FLETCHER, Stephen James'
      , 'OLSEN, David Edward'
      , 'KEARNEY, Nicholas Norman'
      , 'FITZPATRICK, Sean Daniel Thomas'
      , 'EVANS, Richard Warwick'
      , 'MILNE, Michael John'
      , 'SMITH, Ronald Charles'
      , 'KRONFELD, Timothy Paul'
      , 'ATKINSON, Shane'
      , 'BURROW, Michael Ian'
      , 'CARLEY, Bruce Leo Benedict'
      , 'CORBETT, Thomas Frederick'
      , 'DAVIDSON, Alan Daniel'
      , 'FERGUSSON, Thomas Wilson'
      , 'GILBERT, Paul de Vallenger'
      , 'GRAY, James Stephen'
      , 'GRIEVE, Shaun Hayden'
      , 'HAYCOCK, Bruce Kim'
      , 'HUFFLETT, Paul Charles'
      , 'JIANG, Peter'
      , 'LENNOX, Kenneth Duncan'
      , 'McCABE, Kathleen Patricia Louise'
      , 'NELSON, Craig'
      , 'NICHOLLS, Colin William'
      , "O'SULLIVAN, Graeme Arthur"
      , 'REEDER, Joanne McLean'
      , 'RUSSELL, Geoffrey Neil'
      , 'THOMPSON, John Stanley'
      , 'WILSON, Neil John'
    )

    aParty = theElection.addParty('Aotearoa Legalise Cannabis Party')

    aParty = theElection.addParty('Ban1080')

    aParty = theElection.addParty('Conservative')

    aParty = theElection.addParty('Democrats For Social Credit')

    aParty = theElection.addParty('Focus New Zealand')

    aParty = theElection.addParty('Green Party')
    aParty.addListCandidates('STANTON TUREI, Metiria Leanne Agnes'
      , 'NORMAN, Russel William'
      , 'HAGUE, Kevin Grant'
    )
  }
}
```

```

, 'SAGE, Eugenie Meryl'
, 'HUGHES, Gareth Thomas Llewellyn'
, 'DELAHUNTY, Catherine'
, 'GRAHAM, Kennedy Gollan Montrose'
, 'GENTER, Julie Anne'
, 'MATHERS, Mojo Celeste'
, 'LOGIE, Heather Janet'
, 'CLENDON, David James'
, 'SHAW, James Peter Edward'
, 'ROCHE, Denise Maree'
, 'BROWNING, Steffan John'
, 'DAVIDSON, Marama Mere-Ana'
, 'COATES, Robert Barry Hobson'
, 'HART, John Stuart'
, 'KENNEDY, David John'
, 'ELLEY, Jeanette Susan'
, 'McDONALD, Jack Baxter'
, 'MOORHOUSE, David Peter'
, 'ROTMANN, Sea'
, 'LECKINGER, Richard John'
, 'PERINPANAYAGAM, Umesh'
, 'RUTHVEN, Susanne Marie'
, 'MOORE, Teresa Janet'
, 'LANGSBURY, Dora Roimata'
, 'WOODLEY, Tane Hohepa'
, 'PERLEY, Christopher John Keith'
, 'GOLDSMITH, Rachael Louise'
, 'KELCHER, John Michael'
, 'ROGERS, Daniel'
, 'WESLEY, Richard Laurence'
, 'SMITHSON, Anne-Elise'
, 'McALL, Malcolm Ley Stuart'
, 'FORD, Christopher John'
, 'HUNT, Reuben Timothy'
, 'BAILEY, Paul Edward'
, 'CONROY, Caroline Anne'
, 'COUTTS, Susan Jane'
, 'DOHERTY, Paul William'
, 'DREW, Madeleine Rose'
, 'GALLAGHER, Shane Anthony'
, 'HILL, Peter Selwyn'
, 'IRWIN, Frances Ruth'
, 'KANI, Henare Matua'
, 'MACLEAN, Gavin Wareham'
, 'MAYNE, Nicholas Robert'
, 'McLEAN, Ian Gordon'
, 'MOORE, Robert Bruce'
, 'ROBERTS, Sarah Ngairé'
, 'ROBERTSON, Colin Donald'
, 'ROBINSON, David John'
, 'SERVIAN, Mark Anthony'
, 'SIGGAARD, Dorte'
, 'STANSFIELD, Brett Thomas'
, 'STEWART, Gary Todd'
, 'STRICKSON-PUA, Muamua Sofi'
, 'TUPOU, Patricia Margaret'
)

aParty = theElection.addParty('Internet Mana')

aParty = theElection.addParty('Labour Party')
aParty.addListCandidates('CUNLIFFE, David Richard'
, 'PARKER, David William'
, 'ROBERTSON, Grant Murray'
, 'KING, Annette Faye'
, 'ARDERN, Jacinda'
, 'MAHUTA, Nanaia Cybele'
, 'TWYFORD, Philip Stoner'
, 'COSGROVE, Clayton James'
, 'HIPKINS, Christopher John'
, 'MORONEY, Suzanne Mary'
, 'LITTLE, Andrew James'
, 'WALL, Louisa Hareruia'
, 'SHEARER, David James'

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, 'SIO, Sua William'
, 'STREET, Maryan'
, 'GOFF, Philip Bruce'
, 'MACKEY, Moana Lynore'
, 'DAVIS, Kelvin Glen'
, 'WHAITIRI, Meka'
, 'WOODS, Megan Cherie'
, 'HUO, Raymond'
, "O'CONNOR, Damien Peter"
, 'RADHAKRISHNAN, Priyanca'
, 'LEES-GALLOWAY, Iain Francis'
, 'JONES, Rachel Anne'
, 'CLARK, David Scott'
, 'BEAUMONT, Carol Ann'
, 'WILLIAMS, Munokoa Poto'
, 'SEPULONI, Carmel Jean'
, 'COFFEY, Tamati Gerald'
, 'SALESA, Jennifer Teresia'
, 'CRAIG, Elizabeth Dorothy'
, 'RUSSELL, Deborah Faye'
, 'PRIME, Willow-Jean'
, 'MIKA, Jerome'
, 'MILNE, Tony Robert'
, 'ANDERSEN, Virginia Ruby'
, 'SZABÓ, Claire Elizabeth'
, 'WOOD, Michael Philip'
, 'WILLIAMS, Arena Hinekura Sherburd'
, 'McDOUALL, Hamish Crichton'
, 'RAHMAN, Anjum Nausheen'
, 'KAUSHAL, Sushil'
, 'GREER, Christine'
, 'GAYLOR, Penelope Louise'
, 'WALKER, Janette Florence'
, 'HILLS, Richard Brian'
, 'HALBERT, Shanan Kiritea'
, "KANONGATA'A-SUISUIKI, Anahila Lose"
, 'WILSON, Clare Campbell'
, 'DANN, James Macbeth'
, 'ELLIS, Siobhan Kelly'
, 'HADDOCK, Corie Jon'
, 'STRANGE, Jamie Ross'
, 'PAUL, Katie Ann Priocilla'
, 'GIBSON, Steven John'
, 'WU, Chao-Fu'
, 'GRIMSHAW, Paul Radcliffe'
, 'DORREEN, Tracey Pamela'
, 'MAMEDOV, Tofik Shirzad Ogly'
, 'TOROA, Hikiera Johnathan'
, 'TYLER, Allan Hugh'
, 'ELLIOTT, Susan Mary'
, 'BUCKINGHAM, Simon Derek'
)

aParty = theElection.addParty('Maori Party')
aParty.addListCandidates('FLAVELL, Te Ururoa James William Ben'
, 'FOX, Marama Kahu'
, 'McKENZIE, Christopher Owen'
, 'PAENGA, Te Hira Keretene Te Whakaiti'
, 'BUTTON, Ngairi Lorraine'
, 'TUAINI, Nancy Te Urumanao'
, 'ITI, Tame'
, 'KIEL, Eraia James Rangiriri'
, 'KAIPO, Anaru Joseph'
, 'BHANA, Raewyn Teresa'
, 'GLAVISH, Rangimarie Naida'
, 'RERITI-CROFTS, Aroha Hohipera'
, 'TE HAU, Te Hinurewa Ngahiwi Tame Kawe'
, 'PHILLIPS, Thomas Tuatu Toihau'
, 'GATE, Verna Te Roha'
, 'KENDALL, Anne Marie'
, 'PAKINGA, Hiria Gillian'
, 'WINITANA, Claire Te Atamira'
, 'SMITH, Rawiri Richard'
, 'DAVIDSON, Lenis Mary'

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, 'MATAKI, Tania'
, 'GARDYNE, Sheryl Ann'
, 'PHILLIPS, Te Whe Ariki'
, 'WAKEFIELD, Benita Waina'
)

aParty = theElection.addParty('National Party')
aParty.addListCandidates('KEY, John Phillip'
, 'ENGLISH, Simon William'
, 'CARTER, David Cunningham'
, 'BROWNLEE, Gerard Anthony'
, 'JOYCE, Steven Leonard'
, 'COLLINS, Judith Anne'
, 'PARATA, Patricia Hekia'
, 'FINLAYSON, Christopher Francis'
, 'BENNETT, Paula Lee'
, 'COLEMAN, Jonathan David'
, 'McCULLY, Murray Stuart'
, 'TOLLEY, Anne Merrilyn'
, 'SMITH, Nick'
, 'GROSER, Timothy John'
, 'ADAMS, Amy Juliet'
, 'GUY, Allen Nathan'
, 'FOSS, Craig'
, 'BRIDGES, Simon Joseph'
, 'KAYE, Nicola Laura'
, 'WOODHOUSE, Michael Allan'
, 'GOODHEW, Joanne Gay'
, 'BORROWS, Kerry James'
, 'McCLAY, Todd Michael'
, 'LOTU-IIGA, Peseta Samuelu Masunu'
, 'WAGNER, Nicola Joanne'
, 'TISCH, William Lindsay'
, 'UPSTON, Louise Claire'
, 'MACINDOE, Timothy Harley'
, 'ROSS, Jami-Lee Matenga'
, 'GOLDSMITH, Paul Jonathan'
, 'LEE, Melissa'
, 'BAKSHI, Kanwaljit Singh'
, 'YANG, Jian'
, 'NGARO, Alfred'
, 'WILLIAMSON, Maurice Donald'
, 'DEAN, Jacqueline Isobel'
, 'BENNETT, David Allister'
, 'YOUNG, Jonathan Edgar Joseph'
, 'HUDSON, Brett John'
, 'BARRY, Margaret Mary'
, 'McKELVIE, Ian Robert Flockhart'
, 'MITCHELL, Mark Patrick'
, "O'CONNOR, Simon"
, 'SABIN, Michael Lewis'
, 'SIMPSON, Scott Anthony'
, 'FOSTER-BELL, Paul Ayers Robert'
, 'HAYES, Joanne Kowhai'
, 'PARMAR, Kushmiita Parmjeet Kaur'
, 'BISHOP, Christopher'
, 'KORAKO, Tutehounuku'
, 'NAYLOR, Jonathan Mark'
, 'PUGH, Maureen Helena'
, 'TURNER-TUPOU, Fia Taemanu'
, 'BARCLAY, Todd Keith'
, 'BAYLY, Andrew Henry'
, 'DOOCEY, Matthew Maurice'
, 'DOWIE, Sarah Maree'
, 'KURIGER, Barbara Joan'
, 'MULLER, Todd Michael'
, 'RETI, Shane Raymond'
, 'SCOTT, Alastair Oliver'
, 'SMITH, Stuart Tayler'
, 'WALFORD, Wayne Douglas'
, 'BROWN, Simeon Peter'
, 'WALKER, Hamish'
, 'HOLDEN, Lewis'
, 'VARLEY, Karl Daniel'

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, 'PENK, Christopher Aidan'
, 'COOPER, Linda Ann'
, "O'DWYER, Letitia Marie"
, 'BRIDGES, Mark'
, 'SOKRATOV, Boris'
, 'EVETTS, Matthew Zane'
, "O'FALLON, Carolyn Elisabeth"
, 'LITTLEWOOD, Charlotte'
)

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aParty = theElection.addParty('New Zealand First Party')
aParty.addListCandidates('PETERS, Winston Raymond'
, 'MARTIN, Tracey Anne'
, 'PROSSER, Richard Ivor'
, 'TABUTEAU, Fletcher'
, 'STEWART, Barbara Joy'
, 'MITCHELL, Clayton Robert Henry'
, "O'ROURKE, Denis John"
, 'PARAONE, Rewiti Pomare Kingi'
, 'MARK, Ron Stanley'
, 'BALL, Darroch Leicester'
, 'BINDRA, Mahesh'
, 'BOND, Ria Iris Daphne'
, 'PARORO, Mataroa'
, 'RUDZKI, Romuald Edward John'
, 'REEVES, Jon Blaiklock'
, 'LOLE-TAYLOR, Asenati'
, 'CATCHPOLE, Brent Stanley'
, 'ABRAHAM, George'
, 'DOLMAN, Raymond'
, 'BARR, Hugh'
, 'DEGIA-PALA, Anne'
, 'CAMPBELL, Steven Robert'
, 'PERRY, Edwin Jock'
, 'GUDGEON, William M'
, 'PIERSON, Brent'
, 'HUNT, Aaron Ronald'
, 'HALL, John Harold'
, 'TAURIMA, Richard John'
, 'ERTEL, Grant Ernest'
, 'LYON, Clifton Killip'
, 'WOODS, William Edward'
)

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aParty = theElection.addParty('NZ Independent Coalition')

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aParty = theElection.addParty('The Civilian Party')

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aParty = theElection.addParty('United Future')
aParty.addListCandidates('DUNNE, Peter Francis'
, 'SIMMONS, Alan Frank'
, 'LIGHT, Damian Francis'
, 'EUSOFF, Mohamed Sultan'
, 'RICKARD, Benjamin John Cranswick'
, 'WOOLSTON, Jason Bruce'
, 'STONYER, David Lester'
, 'MOCKRIDGE, Bryan'
, 'TODD, Quentin Gregory'
, 'MAXWELL, James Waerengaahika'
, 'PARK, Sevaschan Sam'
)

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/*****/
// Electotrates, Electorate MPs and Votes for Registered Parties by Electorate
/* Party order:
* ACT NEW ZEALAND
* AOTEAROA LEGALISE CANNABIS PARTY
* BAN1080
* CONSERVATIVE
* DEMOCRATS FOR SOCIAL CREDIT
* FOCUS NEW ZEALAND
* GREEN PARTY
* INTERNET MANA
* Labour Party

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* MAORI PARTY
* National Party
* EW ZEALAND FIRST PARTY
* NZ INDEPENDENT COALITION
* THE CIVILIAN PARTY
* UNITED FUTURE
* Informal Party Votes
*/

anElectorate = theElection.addElectorate('Auckland Central')
anElectorate.addWinner('KAYE, Nicola Laura', 'National Party')
anElectorate.addPartyVotes(329, 85, 10, 486, 3, 2, 6242, 553, 6101, 158, 12652, 1459, 7, 17,
53, 99)

anElectorate = theElection.addElectorate('Bay of Plenty')
anElectorate.addWinner('MULLER, Todd Michael', 'National Party')
anElectorate.addPartyVotes(90, 126, 50, 2072, 33, 6, 2645, 187, 4783, 207, 21096, 5100, 104,
10, 78, 88)

anElectorate = theElection.addElectorate('Botany')
anElectorate.addWinner('ROSS, Jami-Lee Matenga', 'National Party')
anElectorate.addPartyVotes(808, 90, 12, 1519, 5, 6, 1461, 204, 7473, 71, 20016, 1825, 9, 8,
49, 128)

anElectorate = theElection.addElectorate('Christchurch Central')
anElectorate.addWinner('WAGNER, Nicola Joanne', 'National Party')
anElectorate.addPartyVotes(167, 165, 27, 1065, 30, 1, 5419, 353, 8995, 157, 15301, 2462, 3,
40, 79, 108)

anElectorate = theElection.addElectorate('Christchurch East')
anElectorate.addWinner('WILLIAMS, Munokoa Poto', 'Labour Party')
anElectorate.addPartyVotes(107, 186, 38, 1058, 20, 1, 4113, 286, 10450, 129, 12928, 3069,
11, 19, 74, 141)

anElectorate = theElection.addElectorate('Clutha-Southland')
anElectorate.addWinner('BARCLAY, Todd Keith', 'National Party')
anElectorate.addPartyVotes(122, 184, 268, 1726, 36, 0, 2647, 158, 5036, 113, 21694, 2135,
32, 10, 68, 107)

anElectorate = theElection.addElectorate('Coromandel')
anElectorate.addWinner('SIMPSON, Scott Anthony', 'National Party')
anElectorate.addPartyVotes(142, 139, 112, 2004, 20, 7, 3724, 259, 5960, 184, 20547, 4741,
17, 11, 64, 117)

anElectorate = theElection.addElectorate('Dunedin North')
anElectorate.addWinner('CLARK, David Scott', 'Labour Party')
anElectorate.addPartyVotes(111, 172, 60, 956, 37, 1, 8035, 603, 11147, 124, 11302, 2364, 7,
27, 86, 99)

anElectorate = theElection.addElectorate('Dunedin South')
anElectorate.addWinner('CURRAN, Clare Elizabeth', 'Labour Party')
anElectorate.addPartyVotes(125, 171, 77, 1104, 80, 7, 4626, 307, 12518, 95, 15003, 3429, 5,
18, 63, 161)

anElectorate = theElection.addElectorate('East Coast')
anElectorate.addWinner('TOLLEY, Anne Merrilyn', 'National Party')
anElectorate.addPartyVotes(82, 150, 122, 1438, 30, 4, 3248, 413, 8022, 334, 17152, 4176, 17,
13, 78, 148)

anElectorate = theElection.addElectorate('East Coast Bays')
anElectorate.addWinner('McCULLY, Murray Stuart', 'National Party')
anElectorate.addPartyVotes(580, 95, 47, 2210, 17, 3, 2712, 222, 4005, 125, 20895, 1964, 4,
20, 69, 73)

anElectorate = theElection.addElectorate('Epsom')
anElectorate.addWinner('SEYMOUR, David Breen', 'ACT New Zealand')
anElectorate.addPartyVotes(1023, 76, 7, 932, 10, 4, 4706, 312, 5045, 174, 23904, 1308, 3,
17, 61, 93)

anElectorate = theElection.addElectorate('Hamilton East')
anElectorate.addWinner('BENNETT, David Allister', 'National Party')
anElectorate.addPartyVotes(250, 110, 28, 1672, 29, 5, 3833, 348, 8264, 222, 17395, 2481, 3,
23, 104, 167)

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anElectorate = theElection.addElectorate('Hamilton West')
anElectorate.addWinner('MACINDOE, Timothy Harley', 'National Party')
anElectorate.addPartyVotes(160, 171, 38, 1571, 43, 7, 2765, 242, 8649, 190, 16072, 3644, 13,
18, 87, 159)

anElectorate = theElection.addElectorate('Helensville')
anElectorate.addWinner('KEY, John Phillip', 'National Party')
anElectorate.addPartyVotes(262, 161, 48, 1692, 23, 3, 4801, 338, 4430, 192, 20689, 2608, 13,
8, 93, 73)

anElectorate = theElection.addElectorate('Hunua')
anElectorate.addWinner('BAYLY, Andrew Henry', 'National Party')
anElectorate.addPartyVotes(313, 136, 46, 1807, 19, 4, 2076, 166, 4699, 144, 22929, 3437, 4,
14, 82, 117)

anElectorate = theElection.addElectorate('Hutt South')
anElectorate.addWinner('MALLARD, Trevor Colin', 'Labour Party')
anElectorate.addPartyVotes(256, 160, 58, 1391, 11, 6, 4966, 281, 10903, 207, 17648, 2913, 7,
19, 136, 199)

anElectorate = theElection.addElectorate('Ilam')
anElectorate.addWinner('BROWNLIE, Gerard Anthony', 'National Party')
anElectorate.addPartyVotes(349, 96, 21, 1300, 14, 3, 4574, 233, 6238, 171, 20377, 1806, 7,
23, 92, 73)

anElectorate = theElection.addElectorate('Invercargill')
anElectorate.addWinner('DOWIE, Sarah Maree', 'National Party')
anElectorate.addPartyVotes(113, 224, 173, 1256, 95, 10, 2581, 210, 8553, 110, 16880, 3806,
11, 23, 68, 153)

anElectorate = theElection.addElectorate('Kaikōura')
anElectorate.addWinner('SMITH, Stuart Tayler', 'National Party')
anElectorate.addPartyVotes(144, 151, 187, 1709, 36, 8, 3366, 169, 6269, 131, 20770, 3612, 8,
13, 96, 122)

anElectorate = theElection.addElectorate('Kelston')
anElectorate.addWinner('SEPULONI, Carmel Jean', 'Labour Party')
anElectorate.addPartyVotes(308, 108, 13, 910, 8, 7, 3298, 432, 12934, 94, 9924, 2595, 7, 15,
48, 179)

anElectorate = theElection.addElectorate('Mana')
anElectorate.addWinner('FAAFOI, Kristopher', 'Labour Party')
anElectorate.addPartyVotes(79, 173, 21, 977, 24, 3, 4691, 351, 12601, 226, 14850, 2493, 5,
28, 116, 155)

anElectorate = theElection.addElectorate('Māngere')
anElectorate.addWinner('SIO, Sua William', 'Labour Party')
anElectorate.addPartyVotes(179, 76, 4, 553, 4, 7, 971, 276, 16925, 84, 5392, 2072, 4, 4, 18,
502)

anElectorate = theElection.addElectorate('Manukau East')
anElectorate.addWinner('SALESA, Jennifer Teresia', 'Labour Party')
anElectorate.addPartyVotes(179, 76, 4, 553, 4, 7, 971, 276, 16925, 84, 5392, 2072, 4, 4, 18,
502)

anElectorate = theElection.addElectorate('Manurewa')
anElectorate.addWinner('WALL, Louisa Hareruia', 'Labour Party')
anElectorate.addPartyVotes(158, 102, 15, 776, 6, 1, 1092, 315, 14579, 191, 7612, 2609, 0,
10, 24, 197)

anElectorate = theElection.addElectorate('Maungakiekie')
anElectorate.addWinner('LOTU-IIGA, Peseta Samuelu Masunu', 'National Party')
anElectorate.addPartyVotes(512, 113, 11, 1095, 8, 8, 3270, 377, 12199, 187, 14394, 2283, 10,
14, 80, 270)

anElectorate = theElection.addElectorate('Mt Albert')
anElectorate.addWinner('SHEARER, David James', 'Labour Party')
anElectorate.addPartyVotes(356, 93, 12, 719, 7, 6, 8005, 603, 10823, 178, 14359, 1512, 5,
11, 57, 176)

anElectorate = theElection.addElectorate('Mt Roskill')
anElectorate.addWinner('GOFF, Philip Bruce', 'Labour Party')
anElectorate.addPartyVotes(610, 74, 17, 1240, 10, 6, 3279, 304, 12086, 132, 14275, 1805, 6,
8, 69, 176)

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anElectorate = theElection.addElectorate('Napier')
anElectorate.addWinner('NASH, Stuart Alexander', 'Labour Party')
anElectorate.addPartyVotes(103, 153, 58, 2270, 27, 6, 3198, 219, 9466, 160, 18005, 2709, 7,
16, 63, 145)

anElectorate = theElection.addElectorate('Nelson')
anElectorate.addWinner('SMITH, Nick', 'National Party')
anElectorate.addPartyVotes(151, 202, 386, 2094, 47, 6, 5381, 317, 9401, 125, 16904, 2918,
11, 12, 95, 124)

anElectorate = theElection.addElectorate('New Lynn')
anElectorate.addWinner('CUNLIFFE, David Richard', 'Labour Party')
anElectorate.addPartyVotes(542, 101, 16, 1233, 33, 3, 3365, 367, 12085, 119, 13136, 2403, 8,
17, 56, 177)

anElectorate = theElection.addElectorate('New Plymouth')
anElectorate.addWinner('YOUNG, Jonathan Edgar Joseph', 'National Party')
anElectorate.addPartyVotes(172, 218, 57, 1201, 28, 4, 3005, 263, 7947, 199, 20969, 3395, 10,
19, 66, 128)

anElectorate = theElection.addElectorate('North Shore')
anElectorate.addWinner('BARRY, Margaret Mary', 'National Party')
anElectorate.addPartyVotes(545, 103, 13, 1673, 34, 2, 4118, 250, 5473, 174, 23762, 2246, 4,
12, 98, 78)

anElectorate = theElection.addElectorate('Northcote')
anElectorate.addWinner('COLEMAN, Jonathan David', 'National Party')
anElectorate.addPartyVotes(573, 122, 17, 1522, 20, 4, 4099, 336, 7803, 162, 17900, 2584, 10,
26, 121, 117)

anElectorate = theElection.addElectorate('Northland')
anElectorate.addWinner('SABIN, Michael Lewis', 'National Party')
anElectorate.addPartyVotes(162, 193, 51, 2243, 64, 216, 3855, 601, 5913, 210, 17412, 4546,
9, 7, 71, 154)

anElectorate = theElection.addElectorate('Ōhāriu')
anElectorate.addWinner('DUNNE, Peter Francis', 'United Future')
anElectorate.addPartyVotes(250, 146, 15, 1118, 22, 4, 5623, 258, 8771, 215, 18810, 1781, 9,
29, 273, 126)

anElectorate = theElection.addElectorate('Ōtaki')
anElectorate.addWinner('GUY, Allen Nathan', 'National Party')
anElectorate.addPartyVotes(111, 138, 61, 1695, 19, 6, 3635, 249, 9543, 169, 18854, 3827, 19,
12, 74, 298)

anElectorate = theElection.addElectorate('Pakuranga')
anElectorate.addWinner('WILLIAMSON, Maurice Donald', 'National Party')
anElectorate.addPartyVotes(1021, 109, 11, 1930, 8, 4, 2192, 214, 5511, 108, 20854, 2456, 8,
16, 78, 101)

anElectorate = theElection.addElectorate('Palmerston North')
anElectorate.addWinner('LEES-GALLOWAY, Iain Francis', 'Labour Party')
anElectorate.addPartyVotes(175, 123, 30, 1549, 10, 7, 3390, 330, 10632, 166, 14835, 2973,
10, 24, 80, 93)

anElectorate = theElection.addElectorate('Papakura')
anElectorate.addWinner('COLLINS, Judith Anne', 'National Party')
anElectorate.addPartyVotes(218, 124, 23, 1431, 9, 5, 1801, 275, 8967, 172, 17733, 3737, 4,
20, 60, 186)

anElectorate = theElection.addElectorate('Port Hills')
anElectorate.addWinner('DYSON, Ruth Suzanne', 'Labour Party')
anElectorate.addPartyVotes(175, 120, 33, 1241, 41, 4, 6812, 298, 9514, 160, 18719, 2641, 1,
26, 80, 105)

anElectorate = theElection.addElectorate('Rangitata')
anElectorate.addWinner('GOODHEW, Joanne Gay', 'National Party')
anElectorate.addPartyVotes(165, 217, 84, 1580, 24, 9, 2715, 142, 8064, 94, 20108, 2848, 13,
20, 114, 154)

anElectorate = theElection.addElectorate('Rangitikei')
anElectorate.addWinner('McKELVIE, Ian Robert Flockhart', 'National Party')

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    anElectorate.addPartyVotes(131, 151, 106, 2115, 15, 7, 2709, 208, 6408, 195, 18596, 3914,
12, 23, 75, 119)

    anElectorate = theElection.addElectorate('Rimutaka')
    anElectorate.addWinner('HIPKINS, Christopher John', 'Labour Party')
    anElectorate.addPartyVotes(126, 194, 84, 1492, 14, 4, 3154, 324, 12176, 149, 15352, 3806,
19, 19, 122, 159)

    anElectorate = theElection.addElectorate('Rodney')
    anElectorate.addWinner('MITCHELL, Mark Patrick', 'National Party')
    anElectorate.addPartyVotes(192, 123, 29, 2661, 15, 5, 3351, 231, 4847, 142, 24051, 3575, 12,
8, 81, 91)

    anElectorate = theElection.addElectorate('Rongotai')
    anElectorate.addWinner('KING, Annette Faye', 'Labour Party')
    anElectorate.addPartyVotes(120, 131, 19, 623, 9, 3, 10176, 568, 11754, 237, 12606, 2097, 7,
21, 143, 217)

    anElectorate = theElection.addElectorate('Rotorua')
    anElectorate.addWinner('McCLAY, Todd Michael', 'National Party')
    anElectorate.addPartyVotes(142, 160, 101, 1361, 16, 4, 2289, 272, 7181, 486, 17660, 4139,
33, 11, 72, 122)

    anElectorate = theElection.addElectorate('Selwyn')
    anElectorate.addWinner('ADAMS, Amy Juliet', 'National Party')
    anElectorate.addPartyVotes(139, 120, 78, 1253, 10, 5, 3910, 184, 4654, 111, 22809, 2494, 5,
16, 87, 65)

    anElectorate = theElection.addElectorate('Tāmaki')
    anElectorate.addWinner('O'CONNOR, Simon', 'National Party')
    anElectorate.addPartyVotes(504, 106, 8, 1122, 10, 13, 3232, 263, 5431, 175, 24091, 1619, 12,
15, 69, 78)

    anElectorate = theElection.addElectorate('Taranaki-King Country')
    anElectorate.addWinner('KURIGER, Barbara Joan', 'National Party')
    anElectorate.addPartyVotes(120, 163, 156, 1907, 20, 8, 2422, 191, 4483, 185, 20637, 3182, 9,
11, 85, 99)

    anElectorate = theElection.addElectorate('Taupō')
    anElectorate.addWinner('UPSTON, Louise Claire', 'National Party')
    anElectorate.addPartyVotes(91, 148, 223, 1729, 29, 7, 2224, 190, 6752, 298, 20703, 3730, 10,
13, 94, 121)

    anElectorate = theElection.addElectorate('Tauranga')
    anElectorate.addWinner('BRIDGES, Simon Joseph', 'National Party')
    anElectorate.addPartyVotes(134, 110, 12, 2146, 17, 3, 2645, 180, 5361, 222, 20728, 5387, 96,
7, 94, 152)

    anElectorate = theElection.addElectorate('Te Atatū')
    anElectorate.addWinner('TWYFORD, Philip Stoner', 'Labour Party')
    anElectorate.addPartyVotes(450, 122, 12, 1243, 9, 0, 2684, 380, 11603, 142, 13614, 2784, 12,
5, 52, 223)

    anElectorate = theElection.addElectorate('Tukituki')
    anElectorate.addWinner('FOSS, Craig', 'National Party')
    anElectorate.addPartyVotes(144, 150, 50, 2357, 18, 5, 3078, 244, 8205, 185, 18680, 2731, 4,
12, 59, 135)

    anElectorate = theElection.addElectorate('Upper Harbour')
    anElectorate.addWinner('BENNETT, Paula Lee', 'National Party')
    anElectorate.addPartyVotes(450, 129, 13, 1613, 4, 4, 2329, 286, 7803, 119, 18122, 2311, 7,
14, 69, 130)

    anElectorate = theElection.addElectorate('Waikato')
    anElectorate.addWinner('TISCH, William Lindsay', 'National Party')
    anElectorate.addPartyVotes(191, 180, 89, 2053, 38, 6, 2075, 178, 5303, 196, 21598, 3870, 10,
8, 78, 127)

    anElectorate = theElection.addElectorate('Waimakariri')
    anElectorate.addWinner('DOOCEY, Matthew Maurice', 'National Party')
    anElectorate.addPartyVotes(80, 127, 69, 1560, 69, 5, 3198, 141, 6835, 95, 20734, 3054, 6,
15, 66, 114)

    anElectorate = theElection.addElectorate('Wairarapa')

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```

    anElectorate.addWinner('SCOTT, Alastair Oliver', 'National Party')
    anElectorate.addPartyVotes(124, 175, 142, 1622, 7, 4, 3134, 164, 7712, 209, 19634, 4393, 8,
22, 59, 116)

    anElectorate = theElection.addElectorate('Waitaki')
    anElectorate.addWinner('DEAN, Jacqueline Isobel', 'National Party')
    anElectorate.addPartyVotes(106, 208, 143, 1741, 86, 5, 4386, 159, 7162, 104, 22656, 2763,
10, 16, 94, 130)

    anElectorate = theElection.addElectorate('Wellington Central')
    anElectorate.addWinner('ROBERTSON, Grant Murray', 'Labour Party')
    anElectorate.addPartyVotes(274, 127, 20, 590, 26, 5, 11545, 578, 9306, 300, 14689, 1399, 5,
49, 117, 101)

    anElectorate = theElection.addElectorate('West Coast-Tasman')
    anElectorate.addWinner('O'CONNOR, Damien Peter", 'Labour Party')
    anElectorate.addPartyVotes(94, 210, 942, 1837, 25, 7, 4658, 271, 8438, 102, 16058, 3123, 14,
11, 71, 192)

    anElectorate = theElection.addElectorate('Whanganui')
    anElectorate.addWinner('BORROWS, Kerry James', 'National Party')
    anElectorate.addPartyVotes(167, 190, 56, 1771, 57, 14, 2546, 259, 9012, 205, 16687, 4221,
13, 22, 75, 112)

    anElectorate = theElection.addElectorate('Whangarei')
    anElectorate.addWinner('RETI, Shane Raymond', 'National Party')
    anElectorate.addPartyVotes(205, 183, 38, 1925, 116, 34, 3611, 386, 6575, 196, 18503, 4936,
15, 16, 93, 117)

    anElectorate = theElection.addElectorate('Wigram')
    anElectorate.addWinner('WOODS, Megan Cherie', 'Labour Party')
    anElectorate.addPartyVotes(317, 154, 41, 1102, 30, 5, 3919, 231, 8764, 145, 13117, 2618, 7,
31, 86, 136)

    anElectorate = theElection.addElectorate('Hauraki-Waikato')
    anElectorate.addWinner('MAHUTA, Nanaia Cybele', 'Labour Party')
    anElectorate.addPartyVotes(43, 306, 34, 159, 5, 10, 2043, 1689, 9724, 2504, 1583, 2796, 1,
3, 14, 302)

    anElectorate = theElection.addElectorate('Ikaroa-Rāwhiti')
    anElectorate.addWinner('WHAITIRI, Meka', 'Labour Party')
    anElectorate.addPartyVotes(24, 313, 25, 130, 2, 4, 2275, 2152, 10489, 2699, 1189, 2490, 11,
2, 6, 325)

    anElectorate = theElection.addElectorate('Tāmaki Makaurau')
    anElectorate.addWinner('HENARE, Peeni Ereata Gladwyn', 'Labour Party')
    anElectorate.addPartyVotes(39, 200, 5, 128, 1, 6, 2438, 2234, 8432, 2651, 1575, 2914, 4, 1,
16, 204)

    anElectorate = theElection.addElectorate('Te Tai Hauāuru')
    anElectorate.addWinner('RURAWHE, Adrian Paki', 'Labour Party')
    anElectorate.addPartyVotes(27, 281, 43, 116, 3, 1, 2442, 1395, 8642, 3611, 1456, 2412, 15,
6, 15, 234)

    anElectorate = theElection.addElectorate('Te Tai Tokerau')
    anElectorate.addWinner('DAVIS, Kelvin Glen', 'Labour Party')
    anElectorate.addPartyVotes(37, 254, 19, 154, 11, 45, 2278, 4246, 8034, 2300, 1938, 3296, 16,
5, 18, 257)

    anElectorate = theElection.addElectorate('Te Tai Tonga')
    anElectorate.addWinner('TIRIKATENE, Rino', 'Labour Party')
    anElectorate.addPartyVotes(35, 282, 99, 153, 15, 3, 3402, 1021, 7607, 2319, 2977, 2657, 8,
9, 18, 125)

    anElectorate = theElection.addElectorate('Waiariki')
    anElectorate.addWinner('FLAVELL, Te Ururoa James William Ben', 'Maori Party')
    anElectorate.addPartyVotes(17, 222, 70, 78, 2, 8, 1787, 2524, 8595, 4880, 1120, 2809, 41, 5,
11, 229)

    return theElection
}
}

```

Notes:

- This assignment ONLY has data for 2014 election.
- Be very aware that SOME of the assorted .add methods return a reference to the new thing they have just added.
- The program has several 'chained' <<whole>> and <<part> relationships.
 - An Election has Parties
 - An Election has Electorates
 - A Party has List Candidates
 - A Party has Electorate MPs
 - A Party has Candidates
- The Party List for Parties which did not win a seat in Parliament has been omitted.
- The code in this iteration code NOT have to deal with Independent Candidates

1. Create the relevant directories and empty class files to make the following program load without errors.

```
<!DOCTYPE html>
<html>
<head>
<meta charset="utf-8">
<title>BCSE101 17S2 Programming Assignment 1</title>
<script src="src/View.js"></script>
<script src="src/candidate.js"></script>
<script src="src/Party.js"></script>
<script src="src/Electorate.js"></script>
<script src="src/Election.js"></script>
<script src="src/Controller.js"></script>
</head>

<body>
<div id="divDisplay"></div>

<script>
var election // deliberately GLOBAL for debugging!
var go = function () {
    election = Controller.setup()
    let theDisplay = document.getElementById('divDisplay')
    document.body.style.fontFamily = 'Courier New'
    theDisplay.innerHTML = election.getAll()
    console.log(election)
}

window.onload = go
</script>
</body>
</html>
```

SECTION B

TOTAL: 5 MARKS

Election, Party, Candidate

1. Build the classes, along with constructor methods which set their attributes.
2. Make sure the following relevant parts of the Controller.setup method works:
Election.addParty
Party.addListCandidates

SECTION C

TOTAL: 5 MARKS

Electorate

3. Create an **Electorate** class with a constructor that sets appropriate attributes.
4. Code Electorate.addWinner method so the calls to it in the Controller.setup method work.

SECTION D

TOTAL: 5 MARKS

Electorate

5. Code the Electodate.addPartyVotes method so the calls to it in the Controller.setup method work.

Writing Display Methods

Provide the following method in the Election class

```
getAll () {  
    let result = 'Election ' + this + View.NEWLINE()  
  
    result += '*PARTIES*' + View.NEWLINE()  
    result += this.getParties() + View.NEWLINE()  
  
    result += '**ELECTORATES**' + View.NEWLINE()  
    result += this.getElectorates() + View.NEWLINE()  
  
    result += '***PARTY LISTS***' + View.NEWLINE()  
    result += this.getCandidateTests() + View.NEWLINE()  
  
    return result  
}
```

6. Write a **getParties** method that display the names of the Parties in entry order (5 marks)
7. Write a **getElectorates** method that display the names of each Electorate (5 marks)
8. Write a **getCandidates** method that display the name of each Party and rank and names its List Candidates (5 marks)
9. Modify the **getParties** method so that it also displays the total party vote for each Party (5 marks)
10. Modify the **getElectorates** method so that it also displays the details of the winning MP (5 marks)
11. Modify the **getCandidates** method that it displays the **Electorate** of all list candidates who won an Electorate (5 marks)