Course Project – Programming Fundamentals [Spring 2022]

You have to make a simulator of cricket match. Make two teams of 11 players each. Each player will have his name, runs scored, balls faced, balls bowled, runs given, wickets taken. **[use 1D/2D/3D arrays]**.

Your match simulation will be performed using excessive use of random function. The execution of the simulation will be in the following order

- Match will be simulated for N number of overs. Value of N will be read from the configuration.txt file. **[use filing]**
- Toss will be done and any team can win the toss and bat first. **[random function]**
- Player 1 and Player 2 of the batting team will appear on the score card. Player 1 will face the first ball. Later on, the batsman facing the ball will be decided as follows: **[setw()]**
    - Score 1,3,5 will mean other end batsman will face next ball.
    - Over completed means other end batsman will face next ball.
- Bowler 1 will be the last player of Team B. Bowler 2 will be the second last player of team B and so on. Last fiver players of Team B will be bowlers. Each bowler can bowl a maximum of total_overs/5 overs (e.g. for a 20 over match, maximum overs bowled by a bowler would be 4).
- Ball will be bowled by pressing ENTER key. Each ball bowled will get a hit which will get some score randomly (-1 – 6). If -1 comes, batsman is declared OUT. **[Scoreboard changes will be done by clearing the screen and then drawing again with new values. You can use system("clear") function to clear the console and should have your own function to draw() scoreboard again with new values which should be passed to the function.]**
- All batsmen don't have same probability of getting out, that is, a bowler (player number 6 to 11) will have 50% chance of getting out on each ball and 50% of getting any score from 0-6. Similarly, a batsman (player number 1 to 5) will have 10% chance of getting out and 90% chance of getting score 0-6 on each ball.

PAKISTAN INNINGS (50 overs maximum)

BATTING		R	B	M	4s	6s	SR
Aamer Sohail	c †Stewart b Pringle	4	19	20	0	0	21.05
Ramiz Raja	lbw b Pringle	8	26	36	1	0	30.76
Imran Khan (c)	c Illingworth b Botham	72	110	159	5	1	65.45
Javed Miandad	c Botham b Illingworth	58	98	125	4	0	59.18
Inzamam-ul-Haq	b Pringle	42	35	46	4	0	120.00
Wasim Akram	run out (†Stewart)	33	18	21	4	0	183.33
Saleem Malik	not out	0	1	2	0	0	0.00

TOTAL	50 Ov (RR: 4.98)	249/6

Did not bat: Ijaz Ahmed, Moin Khan †, Mushtaq Ahmed, Aaqib Javed

Fall of wickets: 1-20 (Aamer Sohail, 4.6 ov), 2-24 (Ramiz Raja, 8.2 ov), 3-163 (Javed Miandad, 39.3 ov), 4-197 (Imran Khan, 43.3 ov), 5-249 (Inzamam-ul-Haq, 49.5 ov), 6-249 (Wasim Akram, 49.6 ov)

BOWLING	O	M	R	W	ECON	WD	NB
Derek Pringle	10	2	22	3	2.20	3	5
Chris Lewis	10	2	52	0	5.20	1	2
Ian Botham	7	0	42	1	6.00	1	0
Phil DeFreitas	10	1	42	0	4.20	0	0
Richard Illingworth	10	0	50	1	5.00	0	0
Dermot Reeve	3	0	22	0	7.33	1	0

- There should be a function to find total score to be displayed on the scorecard which is also displayed by a function. Total score is actually sum of scores of all players who batted. Similarly, total dismissed is sum of all players who got out.
- If a batsman is DISMISSED/OUT, his score card will be displayed until ENTER is pressed again. After that, main score card is displayed again. **[You can stop output until a key is pressed by using cin.get() function. And then clear the screen and then redraw Scoreboard]**

Javed Miandad	c Botham b Illingworth	58	98	125	4	0	59.18

- The innings of the team playing first will end if all overs are bowled or all players are dismissed. In any case, full scorecard should be displayed showing full innings summary.
- There should be a special key to press during the program which will prompt user to enter the over number to directly jump to; so that we can skip ENTER key for each ball and possibility to jump to a particular over or the end of innings directly. To make more interesting, you can introduce an optional short delay after each ball bowled so that you can see how match is proceeding.
- Seconds innings will be executed same as before except that the target, remaining score, remaining overs, required run rate is also included in the score card. You don't need to display first innings scoreboard when second innings is being played.

ENGLAND INNINGS (Target: 250 runs from 50 overs)

BATTING		R	B	M	4s	6s	SR
Graham Gooch (c)	c Aaqib Javed b Mushtaq Ahmed	29	66	93	1	0	43.93
Ian Botham	c †Moin Khan b Wasim Akram	0	6	12	0	0	0.00
Alec Stewart †	c †Moin Khan b Aaqib Javed	7	16	22	1	0	43.75
Graeme Hick	lbw b Mushtaq Ahmed	17	36	49	1	0	47.22
Neil Fairbrother	c †Moin Khan b Aaqib Javed	62	70	97	3	0	88.57
Allan Lamb	b Wasim Akram	31	41	54	2	0	75.60
Chris Lewis	b Wasim Akram	0	1	6	0	0	0.00
Dermot Reeve	c Ramiz Raja b Mushtaq Ahmed	15	32	38	0	0	46.87
Derek Pringle	not out	18	16	29	1	0	112.50
Phil DeFreitas	run out (Saleem Malik/†Moin Khan)	10	8	13	0	0	125.00
Richard Illingworth	c Ramiz Raja b Imran Khan	14	10	9	2	0	140.00
TOTAL	**49.2 Ov (RR: 4.60)**	**227**					

Fall of wickets: 1-6 (Ian Botham, 2.5 ov), 2-21 (Alec Stewart, 7.3 ov), 3-59 (Graeme Hick, 18.6 ov), 4-69 (Graham Gooch, 20.5 ov), 5-141 (Allan Lamb, 34.5 ov), 6-141 (Chris Lewis, 34.6 ov), 7-180 (Neil Fairbrother, 42.5 ov), 8-183 (Dermot Reeve, 43.6 ov), 9-208 (Phil DeFreitas, 47.1 ov), 10-227 (Richard Illingworth, 49.2 ov)

BOWLING	O	M	R	W	ECON	WD	NB
Wasim Akram	10	0	49	3	4.90	6	4
Aaqib Javed	10	2	27	2	2.70	3	1
Mushtaq Ahmed	10	1	41	3	4.10	1	0
Ijaz Ahmed	3	0	13	0	4.33	2	0
Imran Khan	6.2	0	43	1	6.78	0	1
Aamer Sohail	10	0	49	0	4.90	1	0

- When match is finished, user gets an option to show a short summary of the match, show first innings, show second innings, save match data on file, load a previous match data. **[Use files to write and read match data, switch statement to display this menu]**

Result

- Bowler taking highest wickets will be declared bowler of the match.
- Batsman scoring highest runs will be declared batsman of the match.
- Team winning will be shown as winner.

Critical Restrictions/Instructions

- If global variable is used, your project will not be checked and you will get ZERO.
- If a programming construct other than those taught in the course is used, your project will get ZERO.
- If plagiarism is found, your project will get ZERO.
- During viva you will be asked to rewrite some portion of code, do a small task again that you have done in the project. In case of not been able to do that your project will not get more

than 50% marks in any case even if your project is excellent. This is to make sure that you do it yourself.

- You are not supposed to get any help from Internet or peers in making your project logic. Internet will have similar projects so looking at them will result in plagiarism.

Rubrik

Task	Marks
Using arrays (1D, 2D, ..) to make teams.	10
Calculating correct probability of scoring or getting out for the batsmen and bowlers.	10
Function to draw live scoreboard repeatedly (clear screen, redraw with new values)	10
Sub-function to draw live score card -> calculate total score	10
Sub-function to draw live score card -> fall of wickets	10
Sub-function to draw live score card -> overs bowled	10
Sub-function to draw live score card -> run rate	10
Sub-function to draw live score card -> batting board	10
Sub-function to draw live score card -> bowling board.	10
Jump to desired over of the innings directly	10
Final result (bowler and batsman of the match, winning team, match summary)	10
Game configuration file to define number of overs.	10
Write match data and later read it from file	10
Error free program (even if it is not fulfilling all requirements – 50% functions must be implemented)	10
Using dynamically created pointers correctly instead of normal static array at least in case.	10
Properly formatted scorecard as shown in the images	10
Properly formatted/indented and commented program code	10
Total marks	**170**

Submission Guideline

- Submission deadline is June 8, 2022. No late submission will be accepted.\
- You must submit self-marked rubrik along with your code on due date and bring a printout of the same for the viva.
- There will be viva on June 9 and June 10. Viva will be of 15 minutes where you will be asked questions from your submitted code, you will run your program, and you could be given a task to perform.
- You can submit project earlier and request for an early viva.
- You will get ZERO in the project if you miss the viva. In case of unavoidable circumstances, you must submit a valid documentary proof and reschedule your viva BEFORE your allotted time.