

Question 16

(a)

50 (5, 5, 5, 5, 10, 10, 10) marks

Possible solution:

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1  # Question 16(a)
2  # Examination Number:
3  from random import randint
4
5  print("Dice simulation and analysis program") # part (i)
6  results = []
7  frequencies = [0, 0, 0, 0, 0, 0]
8
9  # Generate 100 random values between 1 and 6 and append them to the results list
10 for i in range(100):
11     throw_result = randint(1,6)
12     results.append(throw_result)
13
14     # Start to build up a list of frequencies for each number thrown
15     if throw_result == 1:
16         frequencies[0] = frequencies[0] + 1
17     elif throw_result == 2:
18         frequencies[1] = frequencies[1] + 1
19     # part (iii) - start
20     elif throw_result == 3:
21         frequencies[2] = frequencies[2] + 1
22     elif throw_result == 4:
23         frequencies[3] = frequencies[3] + 1
24     elif throw_result == 5:
25         frequencies[4] = frequencies[4] + 1
26     elif throw_result == 6:
27         frequencies[5] = frequencies[5] + 1
28     # part (iii) - end
29
30 print()
31 #print("Results:",results) # part (iv)
32
33 print("Frequencies:", frequencies) # part (ii)
34
35 # part (v) - start
36 print()
37 print("Dice\tFrequency")
38 print("----\t-----")
39 for i in range(6):
40     print(i+1,"\t",frequencies[i])
41
42 # part (vi) - start
43 print()
44 largest = max(frequencies)
45 print(frequencies.index(largest)+1, "was rolled most often -", largest, "times")
46
47 # part (vii)
48 # Horizontal Bar Chart ... nested loop
49 print()
50 for freq in frequencies:
51     for i in range(freq):
52         print("*", end="")
53     print()
54

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(i)

5 marks (A-5 scale)

5 marks	Correct response Correct implementation using solution above or similar.
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(ii)

5 marks (B-5 scale)

5 marks	Correct response Correct implementation using solution above or similar.
3 marks	Almost correct response <ul style="list-style-type: none">• Correct implementation using solution above or similar but with syntax error.• Correct output displayed but spread over more than a single line.• Correct output displayed in the wrong position.
2 marks	Response with some merit Any other reasonable attempt.

(iii)

5 marks (B-5 scale)

5 marks	Correct response Correct implementation using solution above or similar.
3 marks	Almost correct response Correct implementation using solution above or similar but with syntax error or 'off by one' index error.
2 marks	Response with some merit Any other reasonable attempt.

(iv)

5 marks (A-5 scale)

5 marks	Correct response Correct implementation using solution above or similar.
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(v)

10 marks (B-10 scale)

10 marks	Correct response Correct implementation using solution above or similar.
7 marks	Almost correct response Actual frequency values displayed correctly and any 2 of: <ul style="list-style-type: none">• First header row displayed correctly.• Second header row displayed correctly.• Correct column alignment.• Dice values displayed correctly.
3 marks	Response with some merit Any other reasonable attempt.

(vi)

10 marks (B-10 scale)

10 marks	Correct response Correct implementation using solution above or similar.
7 marks	Almost correct response <ul style="list-style-type: none">• Most frequent value determined but not correctly displayed.• Minor error in code to determine the most frequent value.• Minor error in code to display the number that was rolled most often.
3 marks	Response with some merit Any other reasonable attempt.

(vii)

10 marks (C-10 scale)

10 marks	Correct response Correct implementation using solution above or similar.
8 marks	Almost correct response Correct solution structure but problem with newline e.g. <ul style="list-style-type: none">• Separate newline for each row• No blank lines between rows
5 marks	Response about half-right Correct solution structure but incorrect number of asterisks
3 marks	Response with some merit Any other reasonable attempt.

Coursework (90 marks in total)	
1. Investigation and Plan	Marks
<ul style="list-style-type: none"> Initial research into the context of the brief and existing solutions. Planning and outlining potential solutions to the brief; identifying the potential stakeholders and end-users; consider social implications and how the artefact can be inclusive for all users; refine, list and describe the objectives for the artefact that you will develop. Deeper research on the chosen solution and potential technical solutions that will achieve the artefact objectives. 	20
2. Design	
<ul style="list-style-type: none"> Clearly describes how the requirements of the system are met. Description of the key aspects of how the artefact will be structured; an overview of how different parts of the system will interact which may include a system architecture diagram or system flowchart, data flow diagram(s), algorithms or flowcharts, data model, wireframes, hardware selection and similar. 	20
3. Implementation and Testing	
<ul style="list-style-type: none"> A brief timeline of key dates and milestones achieved in the development of the artefact. Clearly describes the development of the artefact and any problems that were encountered during the process Clearly demonstrates the operation of the system. This should be demonstrated through the use of the video and supporting text if required. Fundamental programming skills are demonstrated, such as using a modular approach, using high level data structures, algorithms, programming constructs, minimal duplication of code, readability, effective use of commenting and similar. A description of the type and extent of testing that took place which may include test cases/table and test data; an explanation of the impact of testing on the development of the artefact. 	40
4. Evaluation	
<ul style="list-style-type: none"> Explains the extent to which your artefact meets your design objectives; how well the needs of the envisaged end-user are met. Describes with justification how your artefact could be modified and improved. 	10
References and Summary word count	
<ul style="list-style-type: none"> You must also include references and/or a bibliography. Include a summary of the word count of the report, including the total word count. 	0

Higher grade	Ordinary grade	Reference Mark	Higher Mark	Ordinary Mark
1		81 – 90	81 – 90	90
2		72 – 80	72 – 80	90
3		63 – 71	63 – 71	90
4		54 – 62	54 – 62	90
5	1	45 – 53	45 – 53	81 – 90
6	2	36 – 44	36 – 44	72 – 80
7	3	27 – 35	27 – 35	63 – 71
8	4	23 – 26	23 – 26	54 – 62
	5	18 – 22	18 – 22	45 – 53
	6	14 – 17	14 – 17	36 – 44
	7	9 – 13	9 – 13	27 – 35
	8	0 – 8	0 – 8	0 – 26

COURSEWORK – conversion from reference mark to Ordinary-level mark

For Ordinary-level candidates, the final mark is found from the reference mark as follows:

- If the reference mark is 54 or more the final mark is 90.
- If the reference mark is at least 27 but less than 54, then add 36 to the reference mark to get the final mark.
- If the reference is at least 1 but less than 27, then double the reference mark and add 9 to get the final mark.
- If the reference mark is 0 the final mark is 0

Reference Mark	Conversion
54 or more	Award 90 marks
27 – 53	Add 36 marks
1 - 26	Multiply the reference mark by 2 and add 9 marks
0	0