J Programming Homework

Please describe any prior computer programming experience you may have:

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Using the verbs and adverbs provided on the handout, any variables mentioned below, and any numbers you need, write a J statement for each of the following.

1. Write 1-2+3 in at least two ways.

2. Write 1+2+3 in at least three ways, using +/ at least once.

3. Write 1*2*3 in at least three ways, using */ at least once.

4. Write 1/2 (one-half) in at least two ways.

5. Write (1+2+3)%7 in at least two ways.

6. Assuming the variable X is a single number, write code that checks if X is greater than 10.

7. Assuming X is a single number, write code that checks if X is greater than or equal to 10.

8. Assuming both X and Y are single numbers, write code that checks if X is greater than 10 and (simultaneously) Y is greater than 10.

9. Assuming both X and Y are single numbers, write code that checks if X is greater than 10 or Y is greater than 10.

10. Assuming the variable A is an array of numbers (such as A =: 3 2 7 5), find the average of the numbers in A.

11. Assuming A is an array, recall that we can compute if each number in the array is an "even number" with the code 0=2|A. That code results in 1's and 0's indicating each number in A is even (1) or odd (0). Write additional code that checks that all numbers in A are even. Then write different code that checks if at least one number in A is even.

12. Assuming A is an array, write code that gives the count (length) of A.

13. Starting with the code `i.5` which generates 0 1 2 3 4, write code that produces three copies of these numbers, i.e., 0 0 0 1 1 1 2 2 2 3 3 3 4 4 4.

14. Using `i.`, write code that generates the numbers 5 6 7 8 9.

15. Using `i.`, write code that generates the numbers _2 _1 0 1 2 3.

16. Write code that rolls 3 20-sided dice.

17. Write code that rolls 3 20-sided dice and adds all the numbers that were rolled.

18. Write code that rolls 3 20-sided dice and adds 2 to each roll.

19. Using the \ adverb, write code that takes an array like 8 1 2 9 7 13 and adds (overlapping) triples of numbers: (8+1+2), (1+2+9), (2+9+7), (9+7+13), resulting in 11 12 18 29.

20. Using the \ adverb, write code that takes an array like 8 1 2 9 7 13 and adds (non-overlapping) triples of numbers: (8+1+2), (9+7+13), resulting in 11 29.

21. Using the \ and ~ adverbs, write code that takes an array like 2 3 1 4 2 4 and computes fractions of (non-overlapping) pairs of numbers: (3%2), (4%1), (4%2), resulting in 1.5 4 2. Notice the second number of the pair is on the top of the fraction, e.g., 3%2.

22. Define arrays X and Y so that X has integer values -10 to +10 and Y has values X^2 for every X value, e.g., create values for the function y=x^2. Write two lines of code that start with X =: and Y =:

23. Define arrays X and Y so that X has integer values -10 to +10 and Y has values y=x^2 + 4x − 5.

24. Define arrays X and Y so that X has integer values -10 to +10 and Y has values y=1/(X + 2).

25. Define an array S that contains 1,000 random integers between -10 and 10.