Questions for the *Computer Programming* exam
a. a. 2023-2024, sem. 1, winter session
gr. FAF-231, FAF-232, FAF-233

1. Computer Programming Discipline. Algorithm. Forms of an algorithm representation
2. Graphic symbols for operations. Flowchart of the algorithm
3. Structure of the program in C language. Structure of the main () function
4. The scanf () and printf () functions for input and output operations. Format specifiers
5. Algorithms with linear structure and branched structure. Conditional statements if, if-else, if-else if ...else if-else and selection statement switch
6. Algorithms of iterative (loop) structure. Preconditional and postconditional loops. Loop statements while, for, do-while
7. Algorithms of iterative (loop) structure. Event and counter controlled loops. Examples.
8. Algorithms with loop-in-a loop structure (nested loops). Statements continue, break, goto
9. Classification of variables in C language. Declarations of variables
10. Operators. Arithmetic and logic expressions
11. Classification of data types in C. Predefined (built-in) data types
12. Basic data types. Type modifiers
13. Derived data types. Arrays and pointers
14. One-dimensional arrays. Declaring, initializing and processing one-dimensional arrays
15. Pointers and operations with pointers in C
16. Arrays and pointers in C
17. Sorting the one-dimensional array by the linear selection method
18. Sorting the one-dimensional array by the selection and exchange method
19. Sorting the one-dimensional array by the bubble method
20. Sorting the one-dimensional array by the insertion method
21. Two-dimensional arrays. Declaring, initializing and processing two-dimensional arrays
22. Functions in C language. Function declaration (prototype), function definition (code) and function call
23. Data exchange between two functions. Sending data into function and receiving data from function
24. Type and return value of the function. Function call as an expression and as a statement
25. Static and dynamic memory allocation in C language
26. Functions for dynamic allocation, reallocation, and freeing of memory in C language
27. Dynamic memory allocation for one-dimensional array
28. Statically allocated two-dimensional array. Pointer to one-dimensional array
29. Sending statically allocated two-dimensional array into function
30. One-dimensional array of pointers. Pointer to pointer
31. Dynamic memory allocation for two-dimensional array using pointer to pointer
32. Dynamic memory allocation for two-dimensional array in the form of dynamically allocated one-dimensional array
33. Sending dynamically allocated two-dimensional array into function
34. Sending function into function. Pointer to function
35. Standard qsort () and bsearch () functions for quick sort and binary search
36. Infinite loop and switch statement for menu options
37. Character data type. Declaring and initializing character variables
38. Standard functions for input a character from the keyboard
39. Standard functions for output a character on the screen
40. One-dimensional array of characters and strings in the C language
41. Functions for input a string from the keyboard
42. Functions for output a string on the screen
43. Standard library functions for characters and strings processing
44. User-defined data types. General characteristics. Using typedef statement
45. Data type structure. Struct data type specification and struct variables declaration
46. Fields (members) of the structure. The operations of access to the fields of the structure. The assignment operation for structure variables
47. One-dimensional array of structures. Database in the form of an array of structures. Structure array processing operations
48. Data type union. Union data type specification and union variables declaration
49. Fields (members) of the union variable. Access and assignment operations. Differences between struct and union variables
50. Data type enumeration. Enumeration data type specification and enum variables declaration
51. Arguments (parameters) of main function
52. Preprocessor directives #include and #define. Macro-definition and pseudo-function. Conditional compiling
53. Local variables and global variables. Life time and visibility of variables. Memory classes
54. File type pointer. Opening and closing a file using fopen () and fclose () functions
55. Standard input and output functions for files
56. Bitwise operations and operators in C language. General characteristics
57. Recursion and recursive functions.

Topics for problems:

1. One-dimensional and two-dimensional array processing
2. Dynamic memory allocation for arrays
3. Implementation of simple sorting and searching algorithms
4. Characters and strings processing
5. File processing
6. Array of structures processing
7. Implementation of functions

06.12.2023 **Lecturer and examiner: associate professor, dr. M. Kulev**