

**Academic Challenge 2021 Topic
Distribution – Computer Science**

Topic	Regional	Sectional	State
General Computing Knowledge (including topics such as basic computer organization, basic networking, or the world wide web)	5	4	4
Digital Logic, Boolean Algebra, Number Systems	4	4	4
Program Logic	15	15	13
Data Structures & Algorithms	4	4	5
Object Oriented Programming	2	3	4
Total	30	30	30

References

- [1] Frank M. Carrano and Timothy M. Henry. *Data Abstraction & Problem Solving with C++: Walls and Mirrors*. Pearson, 6th edition, 2012.
- [2] Thomas H. Cormen, Clifford Stein, Ronald L. Rivest, and Charles E. Leiserson. *Introduction to Algorithms*. McGraw-Hill Higher Education, 2nd edition, 2001.
- [3] Barbara Johnston. *C++ Programming Today*. Pearson, 2nd edition, 2011.
- [4] Timothy O’Leary and Linda O’Leary. *Computing Essentials 2014 Complete Edition*. McGraw-Hill Education, 2013.
- [5] Yale N. Patt and Sanjay J. Patel. *Introduction to Computing Systems: From Bits and Gates to C and Beyond*. Tata McGraw-Hill, 2nd edition, 2003.
- [6] Kenneth H. Rosen. *Discrete Mathematics and Its Applications*. McGraw-Hill College, 6th edition, 2006.
- [7] Walter Savitch. *Problem Solving with C++*. Addison-Wesley Publishing Company, USA, 7th edition, 2008.
- [8] William Stallings. *Computer Organization and Architecture: Designing for Performance*. Pearson, 8th edition, 2009.

Notes Regarding Code on All Exams

All syntax for the various commands will follow that used by C++. Some specific items are listed below. For a more comprehensive list, please consult the references listed.

Some reserved words:

for do while switch case break if else struct const

Some data types:

int float bool char double

Some operators:

- = Used for Assignment
- == Used for comparison of equality/Division, if two integers are used with this operator, the result is an integer with no remainder
- % Modulus, used with two integers, it returns the remainder of the division
- * Star operator, dereferences a pointer to determine the data in which the * pointer is pointing
- & Address operator, returns the memory location or address of the data
- > Right-arrow operator, used to access structure or class elements of the item in which a pointer is pointing
- . Dot operator, used to access structure or class elements of an element of that class

Commands to obtain input from standard input or display to standard output:

- cout Prints data to standard output, the monitor unless otherwise specified
- cin Reads input from standard input, the keyboard unless otherwise specified
- >> used to direct data from standard input to the cin data stream
- << used to direct data from cout to standard output

Note that code segments will be placed in `monospaced` font, with line numbers to the left, and reserved words in **bold** as below.

Sample question using code as described:

1. What is the output of the following code?

```
1 int i;  
2 for (i = 0; i < 4; i++) {  
3     cout << i << " ";  
4 }
```

- A. 1 2 3 4
- B. 0 1 2 3 4
- C. 1 2 3 4 5
- D. 0 1 2 3 4
- E. none of the above