

Delhi Skill and Entrepreneurship University

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AMBEDKAR INSTITUTE OF TECHNOLOGY
SHAKARAPUR

BCA-B

PROBLEM SOLVING PROGRAMMING IN C

Assignment-1

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Problem solving programming in C

Assignment I

1. Define algorithm. State the importance of an algorithm.
2. What is a flow chart? How a flow chart helps a programmer to code a program.
3. What is the importance of pseudocode? Explain in detail.
4. Explain the characteristics of a good algorithm and pseudocode.
5. Write an algorithm to compute the volume of a sphere. Draw the flow chart and also write pseudocode for the same.
6. Write an algorithm to swap two numbers received by user. Also draw the flowchart and give pseudocode.

Question1: -Define algorithm. State the importance of an algorithm.

Answer: - An Algorithm is a set of rules or we can say it's a step-by-step procedure. Algorithm programming is all about writing a set of rules that instruct the computer how to perform a task. Algorithms are written using particular syntax, depending on the programming language being used.

❖ IMPORTANCE OF AN ALGORITHM

- Understandability and Clarity: - Algorithms are basically written in a simple way and it tells the step-by-step procedure, hence it makes the process simple and easy to understand.
- Problem breakdown: - Algorithm writing help the developer to understand the problem and solution by breaking it down in steps. The developer can easily work on a problem that is small, by creating algorithm, the problem gets divided in few small steps.
- Efficiency: - Algorithms are used to find the best possible way of solving a problem so they improve the efficiency of a program. (time and memory efficient)

Question2: -What is a flow chart? How a flow chart helps a programmer to code a program.

Answer: - A flowchart is a diagram that depicts a process, system or computer algorithm. It has rectangles, ovals, diamonds and numerous other shapes to define the type of step, along with connecting arrows to define flow and sequence.

A flowchart presents the problem in the form of a diagram illustration with the sequence of operations to be performed to get the solution of a particular problem. As, diagrams are easy to understand and clear, it makes the communication between programmers and clients easier and makes clarity about the program. Once a flowchart is drawn, it becomes comparatively easy to write the program in any high-level language as we already know the process with all steps, so, after the flowchart is drawn, the programmer can quickly start working on it. In other words, flow charts are mandatory for good documentation of a complex program.

Question3: -What is the importance of pseudocode? Explain in detail.

Answer: - A pseudocode is easy and understandable explanation of logic of a program. It explains the whole logic behind the program and it helps the developer to easily work over the program. Even a person who is not familiar with coding and languages can also understand the logic behind the code by looking at its pseudocode. Pseudocode is user friendly and have a clear presentation. Pseudocode helps the developer to plan the

code before start working on the software or program. If the user directly looks over the code of a particular program, then it could be really hard for them to understand that what is going on. But pseudocode helps the user to understand the code easily and clearly without getting confused or without any trouble. Pseudocodes are generally use to show the logic of a program which is a very important part of any program. If the developer does any mistake in this part, then the whole code or program will get an error. And just by looking at the code of that particular program, the developer can't find the error, but by looking at the pseudocode, the developer can easily point out the mistake or error that has been done their and the developer can easily correct it. Hence, it is easy to find logical errors by the pseudocode of the program.

Question4: -Explain the characteristics of a good algorithm and pseudocode.

Answer: - Characteristics of a good algorithm:

- A good algorithm should be short and easy to understand.
- Clean and clear so that the programmer doesn't get confused and the steps are clearly visible.
- A good algorithm should only have a limited number of steps that explains the process (including start, declaration, read or initializing, logic or loop, display of result and then stop or end)

Characteristics of a good Pseudocode:

- A good pseudocode should be understandable and simple.
- The statements should be clearly defined.

- It should have a proper explanation of the logic behind the program in a brief manner so that the developer can easily start working on the program by following the pseudocode.

Question5: -Write an algorithm to compute the volume of a sphere. Draw the flow chart and also write pseudocode for the same.

Answer: - To find the volume of the sphere we have to use the formula of volume of a sphere that is a $V = \frac{4}{3} \pi r^3$, now we know the value of pi that is 3.14, and we have $\frac{4}{3}$ so now we need to take the value of r from user so that we can find the volume. So, user value will be r, pi will be 3.14 and then we will apply the formula to find the volume and then display.

ALGORITHM

Step 1: - Start

Step 2: - declare variable r , pi=3.14 and V

Step 3: - Read values of r, Radius

Step 4: - Calculate the volume, $V = \frac{4}{3} \pi r^3$

Step 5: - Print V

step 6: - Stop

PSEUDOCODE

Start

Initialize pi=3.14 , r

Printf(Enter the value)

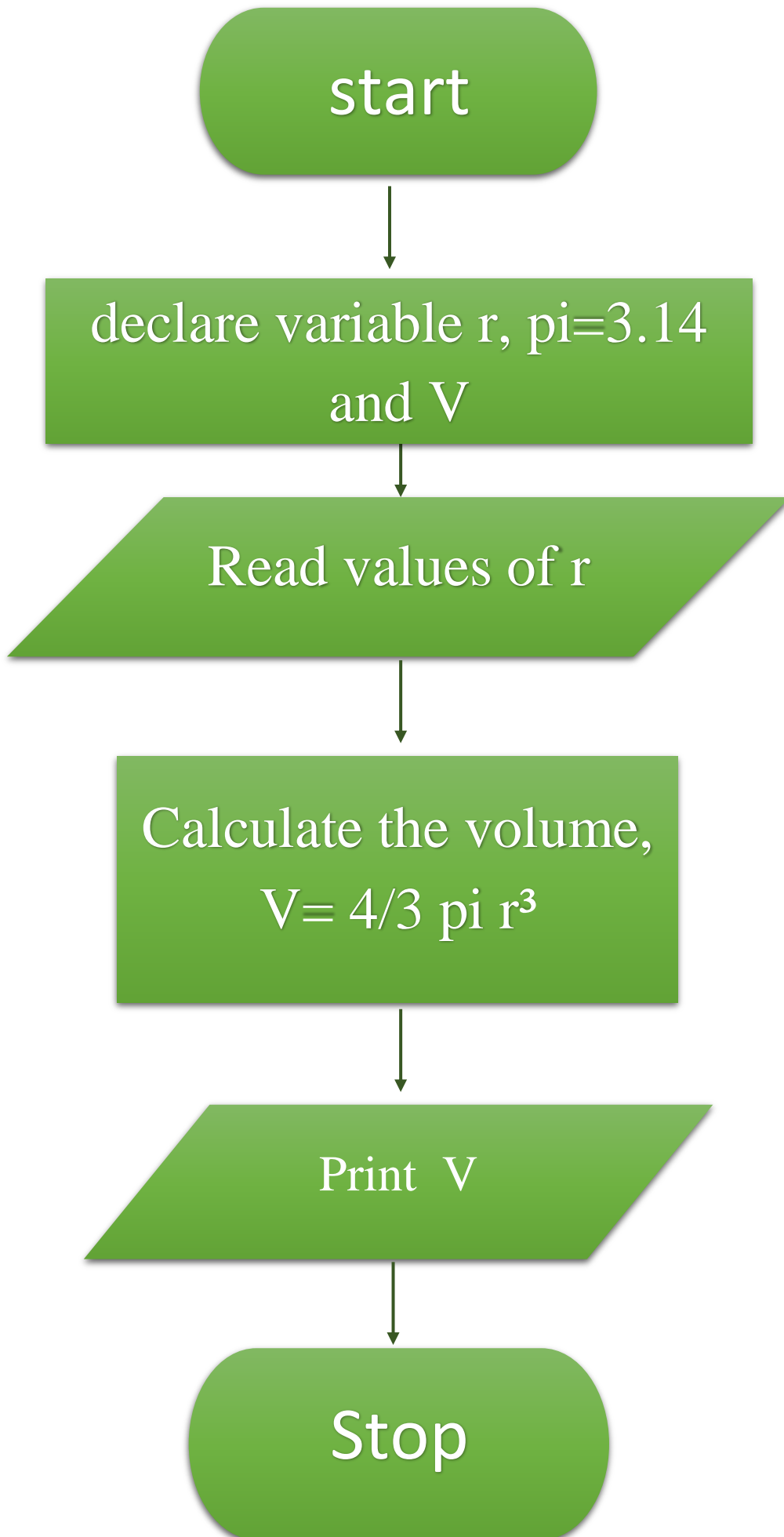
Read the value of r

$V = \frac{4}{3} \pi r^3$

Display v

End

FLOWCHART



Question6: -Write an algorithm to swap two numbers received by user. Also draw the flowchart and give pseudocode.

Answer: - for swapping two number received by user we have to perform some mathematical task.

If the user entered the value $a=2$ and $b=6$

then if we multiply them and then divide them then the value get swapped

... for example. $B=a*b/b = (2*6)/6 = 2$

and $A=b*a/a = (6*2)/2 = 6$

ALGORITHM

Step 1: - Start

Step 2: - declare variable a, b , A, B

Step 3: - Read values of a and b

Step 4: - $A=(b*a)/a$

$B=(a*b)/b$

Step 5: - Print A, B

step 6: - Stop

PSEUDOCODE

Start

Declare a, b, A, B

Printf(Enter the value of a)

Printf(Enter the value of b)

Read the value of a, b

$A=(b*a)/a$

$B=(a*b)/b$

Display A, B

End

FLOWCHART

