

Bülent Ecevit University – Department of Civil Engineering
2012 – 2013 Spring Term
CIV 112 Computer Programming – Midterm Exam

Question - 6. Manning formula is used to calculate the velocity of water in partially flowing pipes:

$$V = \frac{1}{n} R^{2/3} S^{1/2}$$

Where,

V: velocity (m/s)

n: Manning Roughness Coefficient

R: Hydraulic Radius (m)

S: Slope (m/m)

Program uses “n”, “R” and “S” as an input variables and then calculates “V”. At the end, program will display a message "Press x to exit." If user presses another button, program clears screen and restarts itself again (use **exit** variable to check it). Use all necessary libraries and functions.

Screen output of this C program is shown below. Text written in **bold** indicates user given values. “↵” sign means user has pressed the Enter button.

```
Manning Velocity Calculator
Hydraulic Radius (m): 0.125 ↵
Slope (m/m): 0.001 ↵
Roughness Coefficient: 0.015 ↵
Velocity (m/s): 0.53
Press x to exit.
```

Draw a flowchart for complete program(30p)

Write C codes. (30p)

Answer:

C Code

Points

1: #include <stdio.h>	1
2: #include <math.h>	1
3: #include <conio.h>	1
4: #include <stdlib.h>	1
5: main() {	1
6: double V, n, R, S;	2
7: char exit;	1
8: do {	1
9: system("cls");	2
10: printf("Manning Velocity Calculator\n");	1
11: printf("Hydraulic Radius (m): ");	1
12: scanf("%lf", &R);	1
13: printf("Slope (m/m): ");	1
14: scanf("%lf", &S);	1
15: printf("Roughness Coefficient: ");	1
16: scanf("%lf", &n);	1
17: V=(1/n)*pow(R,(2.0/3.0))*sqrt(S);	4
18: printf("Velocity (m/s): %4.2f", V);	1
19: printf("\nPress x to exit.");	1
20: exit=getch();	2
21: } while(exit!='x');	3
22: return 0; }	1

Flowchart

Points

