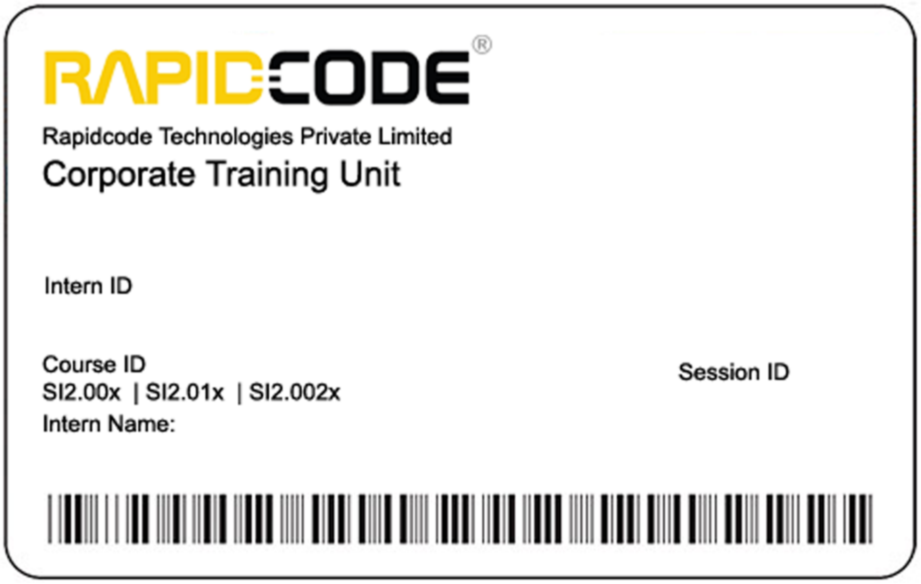

RAPIDCODE®

Rapidcode Technologies Private Limited

Corporate Training Unit

Intern ID

Course ID
SI2.00x | SI2.01x | SI2.002x
Intern Name:

Session ID

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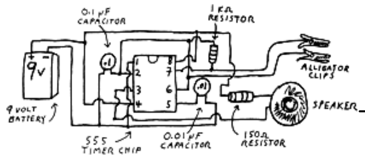

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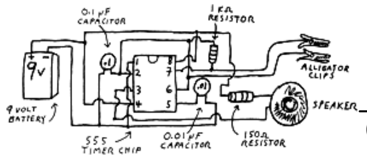
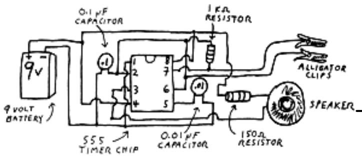


Preface

This report file addresses software/embedded test, assignments and analysis in the context of an overall effort to achieve professional & practical programming. It is designed for use as a primary textbook for a training program in software/ Embedded/ Electronics or system engineering or as a supplementary text in a Corporate Training, and as a resource for programmer/developers/engineers.

The main characteristics of this report file are;

- It is the mirror of your achievement & dedication towards your goal to join the training program & gaining maximum of it through the directed efforts & promises.
- It assumes that the candidate’s goal is to achieve a suitable balance of cost, schedule, quality, skills & professionalism. It is not oriented toward critical systems for which ultra-high reliability must be obtained regardless of cost, nor will it be helpful if one’s aim is to cut cost or schedule regardless of consequence.
- It presents a selection of techniques suitable for near-term application, with sufficient technical background to understand their domain of applicability and to consider variations to suit technical and organizational constraints. Techniques of only historical interest and techniques that are unlikely to be practical in the near future are omitted.
- It promotes a vision of Software/Embedded/ Electronics development and analysis as integral to modern software engineering practice, equally as important and technically demanding as other aspects of development. This vision is generally consistent with current thinking on the subject, and is approached by some leading organizations, but is not universal.
- It treats your passion to programming and static analysis techniques together in a coherent framework, as complementary approaches for achieving adequate quality at acceptable Industry readiness.



Know about Rapidcode Technologies Private Limited

Rapidcode Technologies Pvt. Ltd. is an emerging IT firm started in 2011 with filed registration at Ministry of corporate affairs providing solutions for System Software Development, Embedded Product Development; Electronics & Latest technologies based solutions. Embedded innovations help to unlock the future possibilities of the world. This is just the beginning. We are with you with best reliability.

Company is working into four major segments;

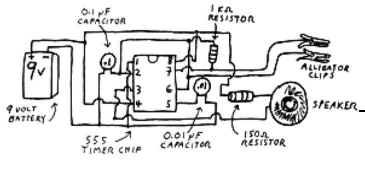
- **Embedded Product Development**;
    - For this section we've R&D facilities in Cochin & Marketing in Bangalore, we're mainly dealing with Home Automation, Agriculture Embedded Application & higher end Device Driver development for various clients. Also we've our own products planning to launch soon.
- **IT/Software Engineering**;
    - At Rapidcode we'd launched <CITY> Wheels, a chain of mobile app & we're developing CRM & Office Management Solution & other customized application in Android, Windows & iOS environment for our prestigious clients.
- **Telecom Infra**;
    - Here we're providing Infra support/maintenance/ installation of BSC/MSC & Remote telecom sites on work order basis.
- **Corporate Training**;
    - We provide core industry based training on various latest and core technologies like C, Linux Internals, Embedded System, Device Driver, Cloud Computing.

As Chief Mentor & Managing Director Mr. Ritesham Shastri is a young prominent technical author who got awarded the President Award in Scouting in 2004 for her vivid representation of Scouting, brotherhood & teamwork.

Professionally, he is an Electronics Engineer. He completed MBA (Operations Mgt.) and M.Sc. (IT), M.Tech.(IT) as well. He has a specialized PG Diploma in Embedded System Design from Indian Government Scientific Society- NIELIT, Calicut. And certifications like Six Sigma & TQM, N + add proficiency to him.

He is having experience of working for Delta Electronics Inc, GTL Ltd, Ericsson, Vodafone, Kerala & Karnataka Govt. Embedded projects. Also worked with the Government Scientists for various projects. He had trained many fresh graduates by last decade.

As two of his innovative research
1. Low cost Digital Fuel Meter,
2. Microwave based Ground penetration Radar, is under process for patent/manufacturer right.



List of reference books (have to read in-depth)

- The C Programming Language (ANSI C Version), 2nd ed.
  - by Brian W. Kernighan and Dennis M. Ritchie -Pearson Education

- Let Us C (English) 13th Edition
  - by Yashavant P. Kanetkar-BPB (Publisher)

- Test Your C Skills (English) 5th Edition
  - by Yashavant P. Kanetkar -BPB (Publisher)

- Exploring C Skills, 2nd Edition
  - by Yashavant P. Kanetkar -BPB (Publisher)

- Advance Programming in the UNIX Environment
  - by W. Richard Stevens -Pearson Education

- The Design of the UNIX operation system
  - by Mauric. J. Bach -Pearson Education

- UNIX Network Programming
  - by W. Richard Stevens -Pearson Education

- Unix System Programming
  - by Subhas K.U. -Pearson Education

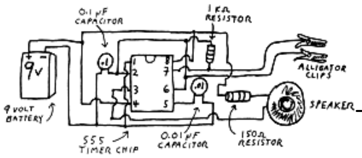
- UNIX Shell Programming (English) 1st Edition
  - by Yashavant Kanetkar -BPB (Publisher)

- The 8051 Microcontroller and Embedded. Systems Using Assembly and C, 2nd ed.
  - by Muhammad Ali Mazidi. Janice Gillispie Mazidi. Rolin D. McKinlay

- Embedded/Real-Time Systems; concepts, Design & Programming, Black Book
  - by Dr. K.V.K.K. Prasad -Dreamtech Press

- ARM System-on-Chip Architecture, 2nd ed.
  - by Steve Furber -Pearson Education

(Purchase of good book is always a lifetime investment, so don’t hesitate while purchasing them)



General Guidelines/Instructions

- Participants are strictly advised to the class on or before time every day .Late comers will not be allowed to enter the class.

- Assignments have to be submitted without fail on a daily basis without giving any true/False reasons to the mentor.

- Failing to which, the candidate would be terminated from the course without further intimation.

- Practice Assignments on a sheet of paper, Compile and rub it on the system" once your code passes all test class, rewrite the working code in a A4 size white sheet and submit them.

- All assignments to on a sheet of paper, compile and run it on the system, once your code passes all test cases, rewrite the working code in a A4 Size white sheet and submit them.

- All assignments to be submitted in a A4 Size white sheet with paper margins. Do not tear pages from the note books and white assignments. Before submitting the written assignments, make sure the code has compiled and run successfully on the system and passed all test cases.

- Do not write and submit Junk Codes.

- Tests have to be taken regularly without fail as per the schedule.

- Request you to not to attend any interviews during the course period. It will disturbance the learning process.

- Placement opportunities would be given to candidates who would score more than 75% in our final score sheet.

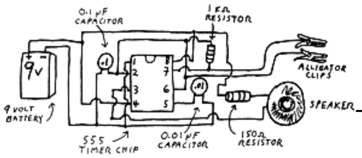
- Before entering the class cell phones must be in silent mode. It is strict advice to do not use cell phone while training hours. Maintain professionalism.

- Female candidates are strictly requested to leave training premises on or before 6;00 PM if found late can request for “safely reach to home policy”.

- Female candidate are requested to carry cell phone along with them.

Now, I know these too

Intern Name:					
Sl No.	Interesting Term	Viva	Start Date	End date	Remarks



Now, I know these too

Intern Name:					
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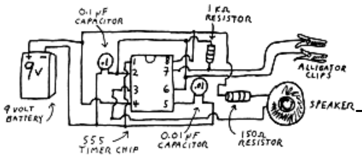

Now, I know these too

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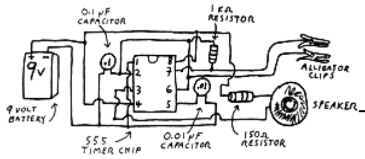

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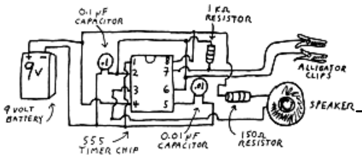

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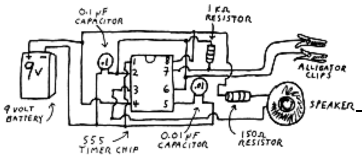


Sample Assignment Submission Sheet

Assignment #.01	Intern ID: xxxxxxxxxx Intern Name:xxxxxxx	**Date:**
Program #01		

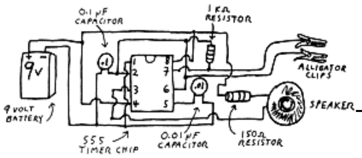
```
/*C program to multiply and display the product of two floating
point numbers entered by user. */

// Author: Ritesham S

// Copyright- Rapidcode Technologies Private Limited, India

// Dated : 01/10/2014; Version 1.0; Release 0.01

#include <stdio.h>

int main( )

{

    float num1, num2, product;

    printf("Enter two numbers:\n ");

    scanf("%f %f",&num1,&num2);        /* Stores the two floating
point numbers entered by user in variable num1 and num2
respectively */

    product = num1*num2;  /* Performs multiplication and stores
it */

    printf("Product: %f\n",product);

    return 0;

}
```

BASIC C- PROGRAMMING ASSIGNMENTS

1. Program to add two numbers.
2. Program to find area of a triangle, given three sides.
3. Program to find whether given number is odd or even.
4. Program to find the Biggest of three numbers.
5. Program to find the sum of first ’n’ natural numbers.
6. Program to find the GCD and LCM of two numbers.
7. Program to printfibonacci series.
8. Program to print sum of even numbers and odd number from 0 to n.
9. Program to find whether a given number is palindrome or not.
10. Program to find whether a given number is prime or not.
11. Program to compute sum of all number that are divisible by 5 from rangel1 to range2 where range 1 <Range 2.
12. Program to implement linear search.(using pointer and arrays)
13. Program to implement binary search.(using pointers and arrays)
14. Program to convent a string from lower –case to upper case
15. Program to reverse a string.
16. Implements Strlen(3)Function.
17. Implement strcmp (3) Function.
18. Program to add two numbers through command line.
19. Program to perform bubble sort.
20. Program to swap two number using pass by reference(or pass by pointers)

BITWISE ASSIGNMENTS

1. Write macro to set a bit in a number.
2. Write macro to mask a bit in a number.
3. Find a number is even or odd.
4. Count the number of bits set in a number.
5. Write a function for getbits (X,P,N)that returns the (Right adjust) n- bit field of x that begins position p.
6. Write a function setbits (X,P,N,Y) that returns x with n bits that begin at possible p set to the rightmost n bits of living the other bits unchanged.
7. Write a function invert (X,P,N) that returns x with the n bits that begin at position p inverted (I,e1 ch and to 0 and vice versa), Leaving the other unchanged.
8. Swap two numbers without using bitwise operator.
9. Multiplication of two numbers using bitwise operator..
10. Toggle odd position of a number.
11. Check a number is power of 2 or not.
12. Write the function for this expression using bitwise operators
    I*n + j/m where n =8,m=4
13. Swap the nibble of a number.
14. Swap ‘n’ number of bits at possions’p1’and’p2’.
15. Right rotate the number by ‘n’ bits.
16. Reverse all the bites if a number



STRINGS ASSIGNMENTS

Note; Write complete program including main for the below assignments. There should be two versions for all the function below. In the first version, take the input string thought fgets(3) and in the second version take the input strings through command line.

Implement the following standards string library functions.

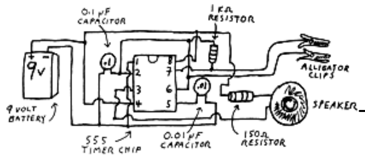
1. strcmp, strncmp
2. strcat, strncat.
3. strcpy,strncpy.
4. strstr
5. strlen.
6. strchr.
7. Reveres a string without using temporary string.
8. Try implementing other standard functions specified in section B3 of Appendix B-Ritchie.

RECURSION ASSIGNMENTS

1. GCD and LCM of a number.
2. Reverse a string using static variables.
3. Multiplication of two numbers.
4. Reveres a number and print.
5. Biggest number in an array.
6. Smallest number in an array.
7. Print binary representation of a number.
8. Fibonacci series.
9. Factorial of a number.
10. Display 1 to 100 to 1 without using loops.
11. Binary search.
12. Display array elements in reverse order.
13. Sum of the elements in an array.
14. Power function(Xy)
15. Permutations of set {a,b,c}
16. strlen( ) without using static variables.

STRUCTURE-UNION-VARARGS ASSEGNMENTS

1. struct book
   ```
   {
            char * name;
           int pages;
           double price;
   }
   ```
   Create an array of 10 book objects, enter values for each object through standard input and print them back on the standard output.
2. Dynamically allocated memory for 10 objects the above structure, enter values for each object through standard input and print them back on the standard output.
3. What are self-referential structures?
4. Explain with example structure padding.
5. Do an analysis on bit fields. Give examples.
6. How do you find whether a given system is in Little Endian or Big Endian format.
7. Extract given byte from a 4-byte integer number.
8. Can we have self- referential unions, if yes prove; if no also them prove.
9. Write a program which has a function to accept any number of arguments and print the sum of all the arguments.
10. Implements minimal of printf (Refer Ritchie; Chapter 7)

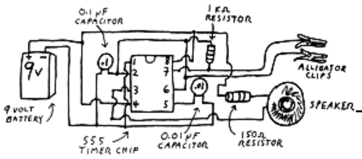


FILE ASSIGNMENTS

1. Create a file named “text” using touch(1)and write few sentences in it.
   Write a program to read the contents from “text.txt” character and print it on to the standard output.
2. Implement cp(1) of UNIX.
3. Assume a file contains 10 names each ended with a new line character. Open the file read the file; do work on logic to print the names from last to first on to the standard output.
4. Write a program to read and right structures in a file{ use fread(3) and fwrite(3)}..
5. Create a file “Test. txt” that contains 100 characters. Write a program to move the file pointer to 10th location of the file and read 20 characters. then move the same file pointer backwards by 5 position from the current and print30 characters. Then move the file pointer to the end of the file and read 30 characters from the last position of the file backwards- then ,find the current position of the file.{hint; use fseek(3),ftell(3)}.
6. What happens if you perform fseek of o bytes on a file, what does that mean?
7. Practice varargs using vfprintf.

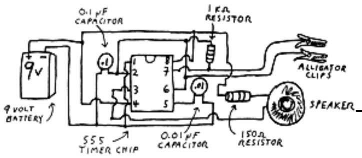
BATTLE WITH POINTERS-1

1. Write a program to pass on integer to a function and print the value there.
2. Write a program to double to a function and print the value there.
3. Write a program to pass two integers to a function, find the sum and return the sum to the main functions.
4. Write a program to pass the address of to integer variables. Add those two numbers and return the address of the sum to the main function.
5. Write a program to pass-1 d array of integers to a function and print its contents there, (Using arrays).
6. Write a program to pass 1-d array of integers to a function, find the sum of all elements. (Using arrays).
7. Write a program to pass 1-D array of integers to a function and print its contents. (Using pointers.)
8. Write a program to pass 1- d array of integers of a function. Find the sum of all elements, (using pointers).
9. Write a program to pass 2-D array of integers to a function and prints its value there. (Using arrays)
10. Write a program to pass 2-D array of integers to a function and find the sum of all elements. (Using arrays).
11. Write a program to pass 2-D array of integers to a function and print its value there. (Using pointers)
12. Write a program to pass 2-D array of integers to a function and find the sum of all elements. (Using pointers).
13. Implements a function that returns bas address of a 1-D array and print the elements in the main functions.
14. Implement a function that returns base address of a 2-D array and print the elements in the main function.
15. Implement a function that returns a pointer to a 1-D array of 5 integer elements
16. Explain array of integer pointers with an example.
17. Implements a function that returns an array of pointers to the main function.
18. Give an example for a pointer that points to an array of pointers each pointing to an integer.
19. Give an example for a pointer that points to an array of pointers each pointers each containing the base address of a 1-D array and the print the elements through the pointer.
20. Write a program to implements a function pointer that receive something and returns an integer.
21. Write a program to implements a functions pointer that receives nothing and returns a pointer to a 1-D array of five integers.
22. Explain array of function pointers with an example.
23. Implement; char (*fptr())[3])();
24. Implement ; (*(*(*fptr)()[20])()



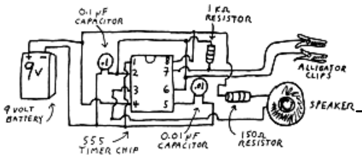
BATTLE WITH POINTERS-2

1. Implement strlen () using pointers.
2. Implements strcpy() using pointer.
3. Implement stract ( ) using pointers.
4. Implement strcmp( ) using pointers.
5. Write a program to pass a string and print there (using arrays)
6. Write a program to pass a string and print there. (Using pointers).
7. Write a program that accepts “n” strings as input from the key board and sort that string.
8. Write a program to convert all the lower case characters to upper case characters and vice versa using pointer.
9. Write a program to reverse a string using pointers.
10. Write a program to implement a minimal version of atoi() using pointers.
11. Implements a function which takes 5 strings as input from the key board and returns it to the main function.
12. Receive command-line arguments through double pointers.



C-QUESTIONS

1. What does static variable mean?
2. What is a pointer?
3. What is a structure?
4. What are the differences between structure and arras?
5. In header files weather functions are declared or defined?
6. What are the difference between malloc() and calloc()?
7. What are macros? What are its advantages and disadvantages?
8. Difference between pass by reference and pass by value.
9. What is static, identifier?
10. Where are the auto variables, free memory and c program instructions get stored.
11. Difference between arrays and linked list?
12. What are enumerations?
13. Describe about storage allocation and scope of global, extern, static, local and register variables?
14. What are register variable? What is the advantage of using register variables?
15. What is the use of typedef?
16. Can we specify variable field width in a scanf() format string? Possible how?
17. Out of fgets() which function is safe to use and why.?
18. Difference between strdup and strcpy?
19. What is recursion?
20. If we want that any wildcard character in the command line arguments should be appropriately expanded, are we required to make any special provision? if yes which?
21. Does there exist any way to make the commands line arguments available to other functions without passing them as arguments to the functions.
22. What are bit fields? What is the use of field in a structure declaration?
23. To which numbering system can the binary number {1101100100}00 be easily converted to?
24. Which bit wise operator is suitable for checking whether a particular bit in a number?
25. Which bit wise operator is suitable for turning of a particular bit in a number?
26. Which bit wise operator is suitable for putting on a particular bit in a number?
27. Which bit wise operator is suitable for checking whether a particular bit is on or off?
28. Which one is equivalent to multiplying by 2; left shifting a number by 1 to left shifting an unsigned in to char by?
29. Write a program to compare two string without using the strcmp()function?
30. Write a program to concatenate two string.
31. Write a program to interchange 2 variables without using the third one?
32. Write program for string reversal & palindrome check?
33. Write a program to find the factorial of a number.
34. Write a program to generate the Fibonacci series?
35. Write a program which employs recursion?

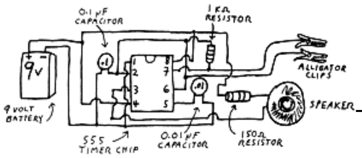


C-QUESTIONS Contd.

36. Write a program which uses command line argument?
37. Write a program which uses functions like strcmps()?etc.
38. What are the advantages of using in a program?
39. How you would dynamically allocated a one –dimensional and two dimensional arrays of integers.
40. How can you increase the size of a dynamically allocated array?
41. When reallocating if any other pointers point into same pieces of memory do you have a readjust these other pointers or do they get readjusted automatically?
42. Which function should be free the memory allocated by calloc()?
43. How much maximum can you allocate in a single call to malloc?
44. Can you dynamically allocated arrays in expanded memory?
45. What is object file? How can you access object file?

OPERATING SYSTEM QUESTIONS

1. What are the basic functions of an operating system?
2. Explain briefly about, processer, assembler, compiler, loader, linker and the functions executed by them.
3. What are the difference phases of software development? explain briefly.
4. Differentiate between RAM and ROM?
5. What is DRAM? in which form does it store data?
6. What is cache memory?
7. What is hard disk and what is its purpose?
8. Differentiate between compiler and interpreter?
9. What is the different task of Lexical analysis?
10. What are the different functions of syntax phase, scheduler?
11. What are the main difference between Micro-controller and micro-processor?
12. Describe Different job scheduling in operating system?
13. What is the real –time system?
14. What is the difference between hard and soft real-time system?
15. What is mission critical system?
16. What is the important aspect of a real time system?
17. If to processes which shares same system memory and system clock in a distributed system, what is it called?
18. What is the state of the processer when a process is waiting for some event to occur?
19. What do you mean by deadlock?
20. Explain the difference between microkernel and macro kernel?
21. Give an example of microkernel?
22. When would you choose bottom up methodology?
23. When would you choose top down methodology?
24. Write a small dc shell script to find number of FF in the design?
25. Why paging is used?
26. Which is the best page replacement algorithm and why? How much time is spent usually in each phases and why?
27. Difference between primary storage and secondary storage?
28. What is multi tasking, multi programming, multi threading?
29. Difference between multi threading and multi tasking?
30. What is software life cycle?
31. Demand paging, page faults, replacement algorithms, thrashing, etc?
32. Explain about paged segmentation and segment paging?
33. While running DOS on a PC, which command would be used to duplicate the entire diskette?



SAMPLE PROJECT

Note;

- Implement using c language?
- Proper error and handing should be done?
- Proper input handling should be done?
- Proper indentation to be maintained.
- Code should be generic .avoid using scanf() functions.
- Use comment lines where ever needed.
- Do not copy others code.
- Code should be professional.