BACHELOR OF COMPUTER APPLICATIONS (BCA)

(Revised Syllabus)

BCA(Revised Syllabus)/ASSIGN/SEMESTER-II

ASSIGNMENTS

(July - 2017 & January - 2018)

MCS-011, MCS-012, MCS-015, MCS-013, BCSL-021, BCSL-022,

SCHOOL OF COMPUTER AND INFORMATION SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
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Important Notes

1. Submit your assignments to the Coordinator of your Study Centre on or before the due date.
2. Assignment submission before due dates is compulsory to become eligible for appearing in corresponding Term End Examinations. For further details, please refer to BCA Programme Guide.
3. To become eligible for appearing the Term End Practical Examination for the lab courses, it is essential to fulfill the minimum attendance requirements as well as submission of assignments (on or before the due date). For further details, please refer to the BCA Programme Guide.

Course Code	**:**	**MCS-011**
Course Title	**:**	**Problem Solving and Programming**
Assignment Number	**:**	**BCA(2)/011/Assignment/17-18**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2017 (For July 2017 Session)** **15th April, 2018 (For January 2018 Session)**

There are eight questions in this assignment which carries 80 marks. Each question carries 10 marks. Rest 20 marks are for viva-voce. Answer all the questions. You may use illustrations and diagrams to enhance the explanations. Include the screen layouts also along with your assignment responses. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

1. Draw a flow chart and write its corresponding C program to convert an octal number to its equivalent decimal number.

2. Write an algorithm and its corresponding C program to illustrate an ATM money withdrawl operation from user's savings' account.
   Note: Assumptions can be made wherever necessary.

3. Write a program to find the largest element in an array using Recursion.

4. Write a C program to separate even and odd numbers of an array and put them in two arrays.

5. Write a C program to determine a given matrix is a sparse matrix.

6. Write an interactive C program to calculate the sum of array elements using pointer.

7. Write an interactive C program to append the contents of a file at the end of another file without using any built-in functions.

8. Write an interactive C program to create a file containing student's records and also give a provision to update/modify the records too.

Course Code	**:**	**MCS-012**
Course Title	**:**	**Computer Organisation and Assembly Language Programming**
Assignment Number	**:**	**BCA(2)/012/Assignment/17-18**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th Oct, 2017 (for Jul-2017 batch)**
	:	**15th April, 2018(for Jan-2018 batch)**

There are four questions in this assignment, which carries 80 marks. Rest 20 marks are for viva voce. You may use illustrations and diagrams to enhance the explanations. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation. Answer to each part of the question should be confined to about 300 words. Make suitable assumption, if any.

1. **(Covers Block 1)**

(a) What are the differences between signed 1's complement notation and signed 2's complement notation for representation of negative fixed point numbers? Find the range of numbers that can be represented in both these notation, if the size of the notations is 8 bits (including sign bit). Explain the difference in the range of the two notations. Perform the following arithmetic operations using signed 2's complement 8-bit representation. (Please note that the numbers given below are in decimal notation) *(2 Marks)*

i) Subtract 30 from –98
ii) Add 69 and 59

Please indicate the overflow if it occurs. How have you identified the overflow?

(b) Perform the following conversion of numbers: *(2 Marks)*

i) Decimal (9999)10 to binary and hexadecimal
ii) Hexadecimal (FEDC9410)H into Octal.
iii) ASCII string "MCS-012Course" into UTF 8
iv) Octal (234567)O into Decimal

(c) Design a circuit for the following function: *(4 Marks)*
$F(A, B, C, D) = \Sigma (0, 1,2, 4, 5, 6, 9, 11, 15)$
Draw the truth table. Use the Karnaugh's map to design the circuit and draw it using AND, OR and NOT gates.

(d) Why is Single Error Correcting (SEC) needed in a computer? What will be length of SEC code for transfer of 16 bit data? A 4 bit data 1011 on transmission is received as 1001, show how the SEC code will detect and correct this error. *(4 Marks)*

(e) Design a two bit counter (a sequential circuit). The counter states are 00, 01, 10, 11, 00, 01, 10, 11, 00…You should show the state table, *(4 Marks)*

state diagram, the k-map for circuit design and logic diagram of the resultant design using D flip-flop or J-K flip flop.

(f) What is floating point number? How is it different to fixed point number? Represent (+678.001)10 and (-0.00000125)10 in IEEE 754 double precision floating point number format. *(4 Marks)*

2. **(Covers Block 2)**

(a) A machine has 32 bit address bus. Its registers are also of 32 bits. The memory of this machine has a word size of 16 bits. *(2 Marks)*
   (i) How many data input and output lines does this RAM need? Explain your answer.
   (ii) What is the maximum size of RAM that can be supported by this machine? Give reason in support of your answer.

(b) A computer has 1 MB RAM and has a word size of 8 bits. It has cache memory having 16 blocks with a block size of 32 bits. Show how the main memory address 10001111101001011101 will be mapped to cache address, if *(4 Marks)*
   (i) Direct cache mapping is used
   (ii) Associative cache mapping is used
   (iii)Two way set associative cache mapping is used.

(c) Differentiate among the three I/O techniques (Programmed I/O, Interrupt driven I/O and DMA). A simple computer is to be designed which can process request of a single user, which of the three I/O techniques is most suitable for this computer? Justify your answer. *(4 Marks)*

(d) A disk having 1280 tracks, each track having 128 sectors with each sector is of size 1M bits. A file having name *mcs012assign.txt* is of size 22M bits. Assume that disk has three free - continuous clusters of 8 sectors each. How can this file be given the space on the disk? Show the content of FAT after the space allocation to the file. You may make suitable assumptions. You may assume the cluster size as 4 sectors, if needed. *(4 Marks)*

(e) Explain the following giving their uses and advantages/disadvantages. (Word limit for answer of each part is 50 words ONLY) *(6 Marks)*
   (i) CD-R
   (ii) LCD Monitor
   (iii)Laser Printer
   (iv)Graphics card
   (v) Small Computer System Interface
   (vi) Cortana software

3. **(Covers Block 3)**

(a) A computer has a single core processor having 16 General purpose registers and 16 additional special purpose registers. The machine has 1

MB RAM. The size of each register and memory word is 32 bits each. An instruction of the machine is of fixed length and is equal to the memory word. Each instruction of the machine has two operands – one memory and second register operand. Memory operand is a direct operand; however, register operand can be direct or indirect. In case register operand is an indirect operand, the stated register contains the address of a memory location. The instruction of machine consists of operation code bits, One addressing mode bit and one register operand and one memory operand. The addressing mode bit specifies addressing mode as:

Addressing mode bit	Register Operand	Memory Operand
0	Direct	Direct
1	Indirect	Direct

Six of the special purpose registers perform the task as Program Counter (PC), Accumulator (AC), Memory Address Register (MAR), Instruction Register (IR), Data Register (DR) and Flag registers (FR). Perform the following tasks for the machine.

(i) Design suitable instruction formats for the machine. Specify the size of different fields that are needed in the instruction format. Also indicate how many different operations can be coded for this machine. Give reasons in support of your answer. *(3 Marks)*

(ii) Put some valid values in certain registers and memory locations and demonstrate examples of different addressing modes of this machine. *(1 Marks)*

(iii) Assuming that the instructions are first fetched to Instruction Register (IR) and memory operands is brought to DR register; indirect operand is brought to AC; and result of operation is stored in the AC register; write and explain the sequence of micro-operations that are required for fetch and execute cycles of an ADD instruction having addressing mode bits as 1. Make and state suitable assumptions, if any. *(6 Marks)*

(b) Assume that you have a machine as shown in section 3.2.2 of Block 3 having the micro-operations as given in Figure 10 on page 62 of Block 3. Consider that R1 and R2 both are 8 bit registers and contains 01001010 and 11100111 respectively. What will be the values of select inputs, carry-in input and result of operation (including carry out bit) if the following micro-operations are performed? (For each micro-operation you may assume the initial value of R1 and R2 as given above) *(2 Marks)*

(i) Subtract R2 from R1
(ii) AND of R1 and R2
(iii) Shift Right R1 twice
(iv) Decrement R1

(c) Explain the functioning of Wilkes Control Unit with the help of a diagram. What is meant by micro-programmed control Unit? *(3 Marks)*

(d) What are the characteristics of a RISC machine? Also explain the pipelining concept in a RISC machine? *(2 Marks)*

(e) A RISC machine has 62 registers out of which 8 registers are reserved for the Global variables and 24 for Instruction related tasks. This machine has been designed to have 6 registers for storing two input parameters, two output parameters and two local variables for function call. Explain with the help of a diagram, how the overlapped register window can be implemented in this machine for function/procedure calls. You must explain how the parameters will be passed when a function calls another function. *(3 Marks)*

4. **(Covers Block 4)**

(a) Write a program in 8086 assembly Language (with proper comments) that accepts four characters entered using the keyboard. It checks if all these characters are alphabets. The program then converts all the characters of the string into equivalent upper case alphabets. These uppercase alphabets are then shown as output. Make suitable assumptions, if any. *(7 Marks)*

(b) Write a program in 8086 assembly Language (with proper comments) that passes a byte containing two packed BCD digits, as parameter to a near procedure named TOBINARY, which converts the packed BCD digits to equivalent binary number. This binary number is returned to the calling assembly program. Make suitable assumptions, if any. *(7 Marks)*

(c) Explain the following in the context of 8086 Microprocessor *(6 Marks)*
(i) Creating 20 bit address using CS and IR register
(ii) Uses of Flag registers in testing various conditions
(iii) Indexed Addressing Modes of 8086 microprocessor

Course Code	**:**	**MCS-015**
Course Title	**:**	**Communication Skills**
Assignment Number	**:**	**BCA(2)/015/Assignment/17-18**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2017 (For July 2017 Session)**
	:	**15th April, 2018 (For January 2018 Session)**

This assignment has six questions. Answer all questions. Please go through the guidelines regarding assignments given in the Programme Guide for the format of presentation.

1. Read the passage below and answer the questions that follow:

   Negotiations are complex because one is dealing with both facts and people. It is clear that negotiators must above all have a good understanding of the subject. They must also be aware of the general policy of the company or institution in relation to the issues and they must be familiar with the organizational structure and the decision-making process.

   However, awareness of these facts may not necessarily suffice to reach a successful outcome. Personal, human factors must be taken into account. The approach and strategy adopted in negotiating are influenced by attitude as well as by a cool, clear logical analysis of the facts and one's interests. The personal needs of the actors in negotiating must therefore be considered. These can include a need for friendship, goodwill, credibility, recognition of status and authority, a desire to be appreciated by one's own side and to be promoted and, finally, an occasional need to get home reasonably early on a Friday evening. It is a well-known fact that meetings scheduled on a Friday evening are shorter than those held at other times. Timing can pressure people into reaching a decision and personal factors can become part of the bargaining process.

   Researchers who have studied the negotiating process recommend separating the people from the problem. An analysis of negotiating language shows that, for example, indirect and impersonal forms are used. This necessity to be hard on the facts and soft on the people can result in the sometimes complex, almost ritualistic, style of negotiating language.

   Language varies according to the negotiating style. In negotiating you can use either a co-operative style or a competitive one. In the co-operative style the basic principle is that both parties can gain something from the negotiation without harming the interests of the other. Or in other words that both parties will benefit more in the long run in friendship and co-operation even if they make some concessions. This type of negotiation is likely to take place in-house between colleagues and departments, or between companies when there is a longstanding relationship and common goals are being pursued.

   Unfortunately co-operative style negotiations without a trace of competition are rare. In most negotiating situations there is something to be gained or lost. There can be a danger in adopting a co-operative mode, as unscrupulous people may take advantage of co-operative people.

The opposite mode to co-operative negotiating is competitive negotiating. Negotiators see each other as opponents. Knowledge of the other party's needs is used to develop strategies to exploit weaknesses rather than to seek a solution satisfactory to both sides. This type of negotiating may be appropriate in the case of one-off contracts where the aim is to get the best result possible in negotiations. Needless to say, the language in this type of discussion may become hostile and threatening even if it remains formal.

1a Why are negotiations not a simple matter? Discuss. *(3 Marks)*

1b Is a strong awareness of the facts sufficient? Give reasons for your answer. *(4 Marks)*

1c When are meeting relatively short? Why? *(3 Marks)*

1d Fill in the blanks: *(3 Marks)*
Research has shown that it can help to separate the ……..from the ……This can be done by using special negotiating…….

1e What kind of language is used while negotiating? *(3 Marks)*

1f Give three differences between the two styles of negotiations. *(3 Marks)*

1g Which style of negotiation do you think the writer recommends? Why? *(3 Marks)*

1h Give a suitable title to the passage. *(3 Marks)*

1i Given below are the opposites of the words in the passage. *(5 Marks)*
What are these words? Select them from the passage:

i	simple	ii	fiction
iii	specific	iv	emotional
v	lose	vi	benefit
vii	frequent	viii	honest
ix	friends	x	strengths

2. (i) You are the sales manager of Quick Track Technologies, manufacturing anti-virus software. You had sent a consignment of goods through Zedex, to your clients, Empire stores, in Hyderabad, but they have not received the goods. Write a letter of complaint to Zedex. *(10 Marks)*

(ii) Draft a reply from the Manager, Zedex, apologizing to Quick Track Technologies for the lapse and state what action you have taken in the matter. *(10 Marks)*

3. Put the verbs in the correct tense and form. *(10 Marks)*

Jaya: If Nikhil got more pocket money, he <u>would waste</u> (waste) it all on stupid things.

Nikhil: That isn't true. If I had more money, I ……(spend) it on a guitar.

Vijay: If I ……(win) a lottery, I would buy a racing bicycle.

Nikhil: I ……..(not buy) a racing bicycle, if I were you. They're much too expensive.

Jaya: If I had more money, I ……..(save) it for a trip to England.

If I …….(have) a lot of money, I ……..(buy) a motorbike.

Vijay: I ……..(not buy) a motor bike if I ……(be) you. You wouldn't get a license to ride it.

If I didn't have to go to school, I …….(have) got a job.

Vijay: The only job you would get if you ……..(not go) to school is washing dishes in a dhaba. And you don't like washing dishes.

4. Complete the passage below with the prepositions/particles in the box. *(10 Marks)*

up	at	down	through	out
with	for	in	from	on

I'd like to take you_____ the figures and spell_____ the implications. First of all, could you look _____ the P&L account. As you can see, the figures are basically _____ line_____the budget, except _____ the fixed costs, which are 10 per cent _____last year. This means that the operating profit is nearly 5 per cent _____ last year. We need to relook _____ our strategy for greater financial health _____the company.

5. **Asking Wh-Questions.** Example: *(10 Marks)*
You want to know where the nearest payphone is.
Where's the nearest payphone?

Now make questions in a similar ways.

i. Find out when Mr. Ragavan will be back.
ii. You'd like to know why the sales office hasn't called.
iii. Find out when the manager normally arrives at the office.
iv. You want to know why the consignment has been delayed.
v. Find out what number you should dial for directory inquiry.
vi. You're interested in knowing where he is phoning from.
vii. You need to know where you could reach your boss.
viii. Find out what the mobile number of the Managing Director is.
ix. Find out how she spells her name.
x. Find out the way to the office.

6. Prepare a report for the Head Office on the collapse of a two storeyed accommodation under your charge. Say why it happened, what was the damage, whether anyone was hurt, what steps you took immediately. (About 300 words) *(20 Marks)*

Course Code	**:**	**MCS-013**
Course Title	**:**	**Discrete Mathematics**
Assignment Number	**:**	**BCA(2)/013/Assignment/17-18**
Maximum Marks	**:**	**100**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th October, 2017 (For July 2017 Session)**
	:	**15th April, 2018 (For January 2018 Session)**

There are eight questions in this assignment, which carries 80 marks. Rest 20 marks are for viva-voce. Answer all the questions. You may use illustrations and diagrams to enhance the explanations. For more details, go through the guidelines regarding assignments given in the Programme Guide.

Question 1

(a) Explain different logical connectives with the help of examples. *(3 Marks)*

(b) Make truth table for followings: *(3 Marks)*
i) $p \rightarrow (q \vee \sim r) \wedge (\sim p \vee \sim r)$
ii) $p \rightarrow (r \wedge \sim q) \wedge (\sim p \wedge \sim q)$

(c) Draw Venn diagram to represent followings: *(2 Marks)*
i) $(A \cup B) \cup (B \cap C \cup D)$
ii) $(A \cup B \cap C) \cap (C \sim A)$

(d) Explain logical equivalence with the help of example. *(2 Marks)*

Question 2

(a) Write down suitable mathematical statement that can be represented by the following symbolic properties. *(2 Marks)*
i) $(\exists x)(\forall y)(\forall z) P$
ii) $(\forall x)(\forall y)(\exists z) P$

(b) Write the following statements in the symbolic form. *(2 Marks)*
i) Some students can pass in exam.
ii) Everything is having life.

(c) What is indirect method of proof? Example with example. *(2 Marks)*

(d) What is relation? Explain equivalence relation with the help of an example. *(4 Marks)*

Question 3

(a) Draw logic circuit for the following Boolean Expressions: *(2 Marks)*
i) (x y z) + (x+y+z)'

(b) Find dual of Boolean Expression for Q, in the figure given below. *(2 Marks)*

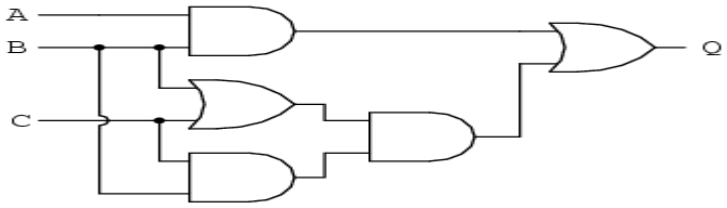

Figure 1: Logic Circuit

(c) Explain De Morgan's laws in relation to Boolean Algebra. *(2 Marks)*

(d) What is principle of mathematical induction? Explain with the help of an example. *(4 Marks)*

Question 4

(a) How many different committees can be formed of 12 professionals, each containing at least 2 Professors, at least 3 Lecturers and 3 Administrative Officers from a set of 5 Professors, 8 Lectures and 5 Administrative Officers. *(3 Marks)*

(b) There are two mutually exclusive events A and B with P(A) =0.7 and P(B) = 0.6. Find the probability of followings: *(3 Marks)*
i) A and B both occur
ii) Both A and B does not occur
iii) Either A or B does not occur

(c) What is set? Explain the basic properties of sets. *(4 Marks)*

Question 5

(a) How many words can be formed using letter of **UNIVERSITY** using each letter at most once? *(2 Marks)*
i) If each letter must be used,
ii) If some or all the letters may be omitted.

(b) Show using truth table that: *(2 Marks)*
$(p \rightarrow q) \rightarrow q \Rightarrow p \vee q$

(c) Explain whether $(p \vee q) \rightarrow (q \rightarrow r)$ is a tautology or not. *(2 Marks)*

(d) Explain addition theorem in probability. *(2 Marks)*

(e) Prove that the inverse of one-one onto mapping is unique. *(2 Marks)*

Question 6

(a) How many ways are there to distribute 15 district objects into 5 distinct boxes with: *(2 Marks)*

i) At least three empty box.
ii) No empty box.

(b) Explain principle of multiplication with an example. *(2 Marks)*

(c) Set A,B and C are: A = {1, 2, 3,5, 8, 11 12,13}, B = { 1,2, 3 ,4, 5,6 } and C={ 7,8,12, 13}. Find $A \cap B \cup C$, $A \cup B \cup C$, $A \cup B \cap C$ and (B~C) *(3 Marks)*

(d) In a class of 40 students; 30 have taken science; 20 have taken mathematics and 8 has neither taken mathematic nor science. Find how many students have taken: *(3 Marks)*
i) both subjects.
ii) exactly one subject

Question 7

(a) What is power set? Write power set of set A={1,2,5,6,7,9}. *(2 Marks)*

(b) Draw truth table for $(P \rightarrow Q) \vee (Q \rightarrow P)$ and explain whether it is a tautology or not. *(2 Marks)*

(c) What is a function? Explain domain and range in context of function, with the help of example. *(3 Marks)*

(d) State and prove the Pigeonhole principle. *(3 Marks)*

Question 8

(a) Find inverse of the following functions *(2 Marks)*

f(x) = $\frac{x^2+2}{x-3}$ $x \neq 3$

(b) Explain circular permutation with the help of an example. *(2 Marks)*

(c) Give geometric representation for followings: *(3 Marks)*
i) { 3} x R
ii) {1, 2) x (2, 3)

(d) Show whether √15 is rational or irrational. *(3 Marks)*

Course Code	**:**	**BCSL-021**
Course Title	**:**	**C Language Programming**
Assignment Number	**:**	**BCA(2)/L-021/Assignment/17-18**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last date of Submission	**:**	**15th Oct, 2017 (for Jul-2017 batch)**
	:	**15th April, 2018(for Jan-2018 batch)**

This assignment has one question and carries 40 marks. Rest 10 marks are for viva voce. You may use illustrations and diagrams to enhance the explanation. Please go through the guidelines regarding the assignments given in the programme guide for the format of presentation.

1. Write an interactive program which prompts the user with the following *(40 Marks)* options on the opening menu:
   1) Student Information
   2) Course Material Despatch Status
   3) Fee Status (Paid or Due for Payment)
   4) Time Table for Theory Counselling
   5) Time Table for Practical Counselling
   6) Assignment Submission Schedules
   7) Change of the Correspondence Address
   8) General Queries
   9) Quit

   Enter your choice:

   If an "1" is entered, prompt the student for the enrolment number and display the student information containing the details the semester he registered for, year of study, name of the programme, batch, duration details, name of the study centre, name of the regional centre, details regarding the fees s/he paid etc . If **"2"** is entered course material despatch status should be displayed whether it was sent or due for despatch. If **"3"** is entered fee status for the particular semester should be displayed. If **"4"** is entered, it should give the schedule for the theory counselling upon giving the batch number as input. . If **"5"** is entered, it should give the schedule for the practical counselling upon giving the batch number as input. If "**6**" is entered the assignment submission schedules need to be displayed. If **"7"** is entered it should display the present correspondence address and should prompt the user to enter the change in the same if any and the necessary file is to be updated with the revised address. If **"8"** is entered it should present the general frequently asked questions. If **"9"** is entered, it should exit from the program. If the user enters any letters or numbers other than the choice, redisplay the prompt. All output should go to the terminal and all input should come from the keyboard.

   Note: (i) You must execute the program and submit the program logic, sample input and output along with the necessary documentation for this question.

   (ii) Assumptions can be made wherever necessary.

Course Code	**:**	**BCSL-022**
Course Title	**:**	**Assembly Language Programming Lab**
Assignment Number	**:**	**BCA(2)/L-022/Assignment/17-18**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last Dates for Submission	**:**	**15th Oct, 2017 (for Jul-2017 batch)**
	:	**15th April, 2018(for Jan-2018 batch)**

This assignment has two questions of total of 40 marks. Rest 10 marks are for viva voce. Please go through the guidelines regarding assignments given in the programme guide for the format of presentation.

1. Design a two bit counter circuit that counts from 0 to 2 only, that is, it will have states 00, 01, 10 only. The initial state of the counter may be assumed to be 00. The counter will be in following successive states: 00, 01, 10, 00, 01, 10, 00, 01, 10, 00 ... Use any flip flop to design the circuit. You must design them using state transition diagram and Karnaugh's map. *(10 Marks)*

2. Write and run following programs using 8086 assembly language. *(30 Marks)*

   (a) Write and run an Assembly language program that converts an ASCII string containing decimal digits, stored in three consecutive locations in the memory into equivalent binary number. You may assume that the three locations contains ASCII equivalent of digit 3, digit 4 and digit 5. The output of this program should be stored in AX register.

   (b) Write and run (using appropriate calling program) a near procedure in 8086 assembly language that accepts an ASCII value as a parameter in AL register and displays this value on the output screen.

   (c) Write and run an 8086 assembly language program that finds the sum of 10 consecutive byte values stored in an array in the memory. The result should be stored in AX register.