

# BCI433 – IBM Business Computing



Lecture 1  
Introduction to IBM Systems

# Agenda

- ▶ Course Description
- ▶ Credits
- ▶ Learning Outcome
- ▶ Tests and Assignment
- ▶ Brief History of IBM AS/400 System I or iSeries
- ▶ Lec # 1
- ▶ Lab # 1 (Pending AS/400 IDs)

# Course Description

- ▶ This course introduces business information technology on the IBM midrange family of computers running the IBM i operating system.
- ▶ Students will utilize an object-based architecture using IBM i tools to create business applications.
- ▶ These applications will be developed using the DB2 relational database, Control Language commands and programming, and the business-oriented RPGLE programming language.
- ▶ To demonstrate the heterogeneous systems support available on the IBM i platform, students will investigate the Integrated File System, which supports non-native file systems, desktop connectivity tools, and support for mobile application development.
- ▶ [Course Outline](#)  
<https://www.senecacollege.ca/ssos/find/BCI433/current/ce>

# Credits

- ▶ Required for
  - CPA – Computer Programming and Analysis (Ontario College Advanced Diploma)
  - CPD – Computer Programmer (Ontario College Diploma)

# Learning Outcome

- ▶ Upon successful completion of this subject the student will be able to:
  - Use IBM's object-based operating system to create, house and manage enterprise applications.
  - Apply IBM i security commands to ensure that IBM i databases and libraries are protected.
  - Apply IBM application development tools and RPGLE programming language when developing business applications.
    - Create a simple mobile application that runs on IBM i to demonstrate tool effectivity (Optional)
  - Use the system command language to run and manage business applications as batch and interactive jobs that utilize resources efficiently.
    - Embed structured query language statements in application development programming code .
  - Use IBM i operating system menus and create custom user menus.

# Test and Assignment

- ▶ 2 Assignment - 30 %
- ▶ 2 Tests - 35 %
- ▶ 6 or 7 Labs – For Practicing (No marks)
- ▶ Exam - 35 %
  - Total - 100 %

# Week # 1 – Agenda

- ▶ Introduction and MochaSoft Software TN5250 Emulator
- ▶ iSeries Operating System Overview
- ▶ Sign on process
- ▶ User Profile
- ▶ Navigation
- ▶ iSeries HELP – F1
- ▶ Control Language (CL)
- ▶ System Values
- ▶ Queues

# Week # 1- Introduction

- ▶ E-mail: [azmat.bhatti@senecacollege.ca](mailto:azmat.bhatti@senecacollege.ca)
- ▶ iSeries Emulator: <http://www.mochasoft.dk>

# Week # 1- Overview of the iSeries-AS/400

Developed by IBM to support medium to large scales business  
i means “integration”



- A server designed for the on demand challenges of Web and e-business, as well as core On-line Transaction Processing (OLTP) workloads, with support for multiple operating and application environments.

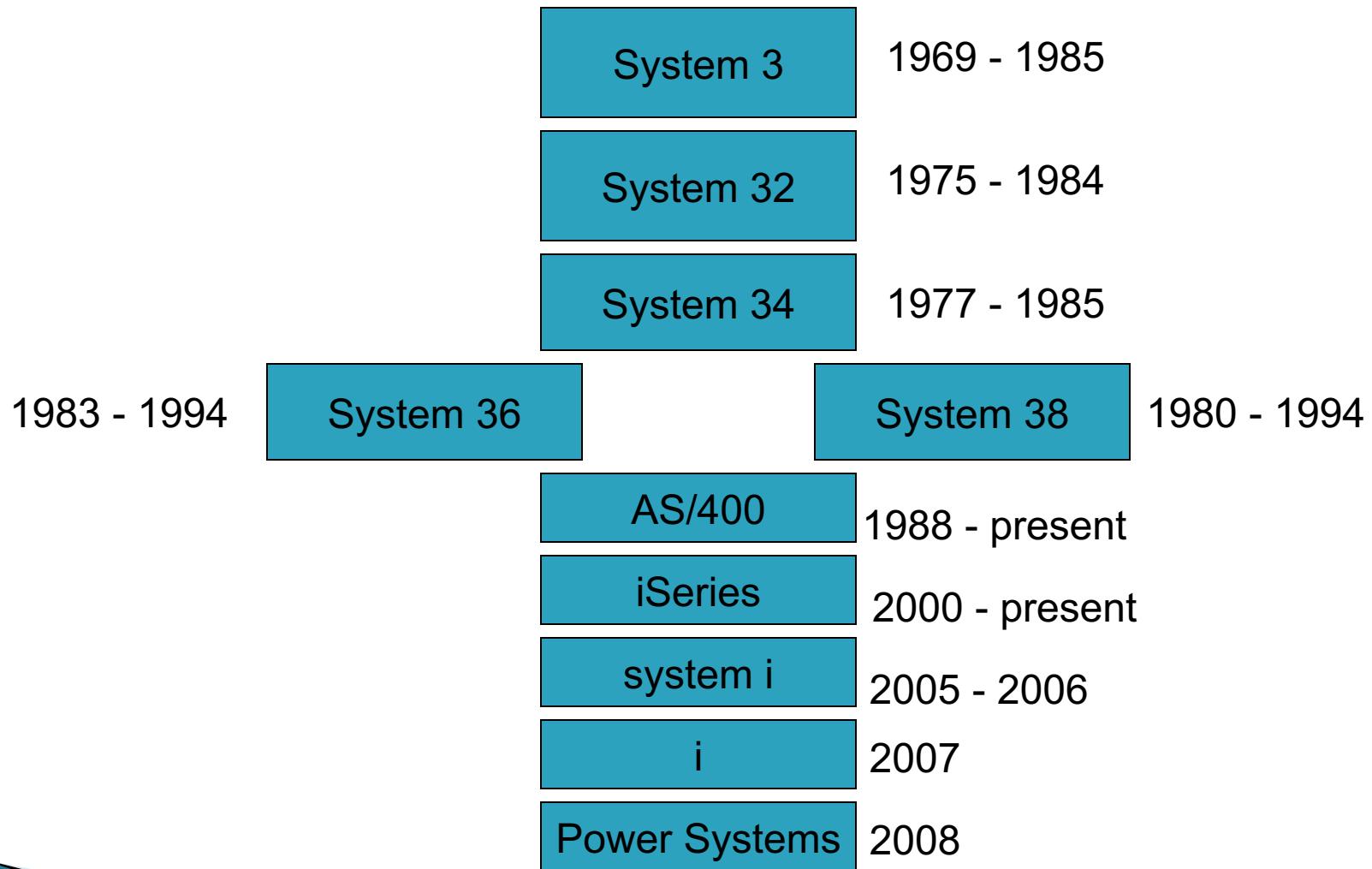
## AS/400 history

- IBM Rochester, Minnesota
- Midrange system
- Different and extremely closed-source
- Project Silverlake
- Designed by Dr. Frank Soltis [1]

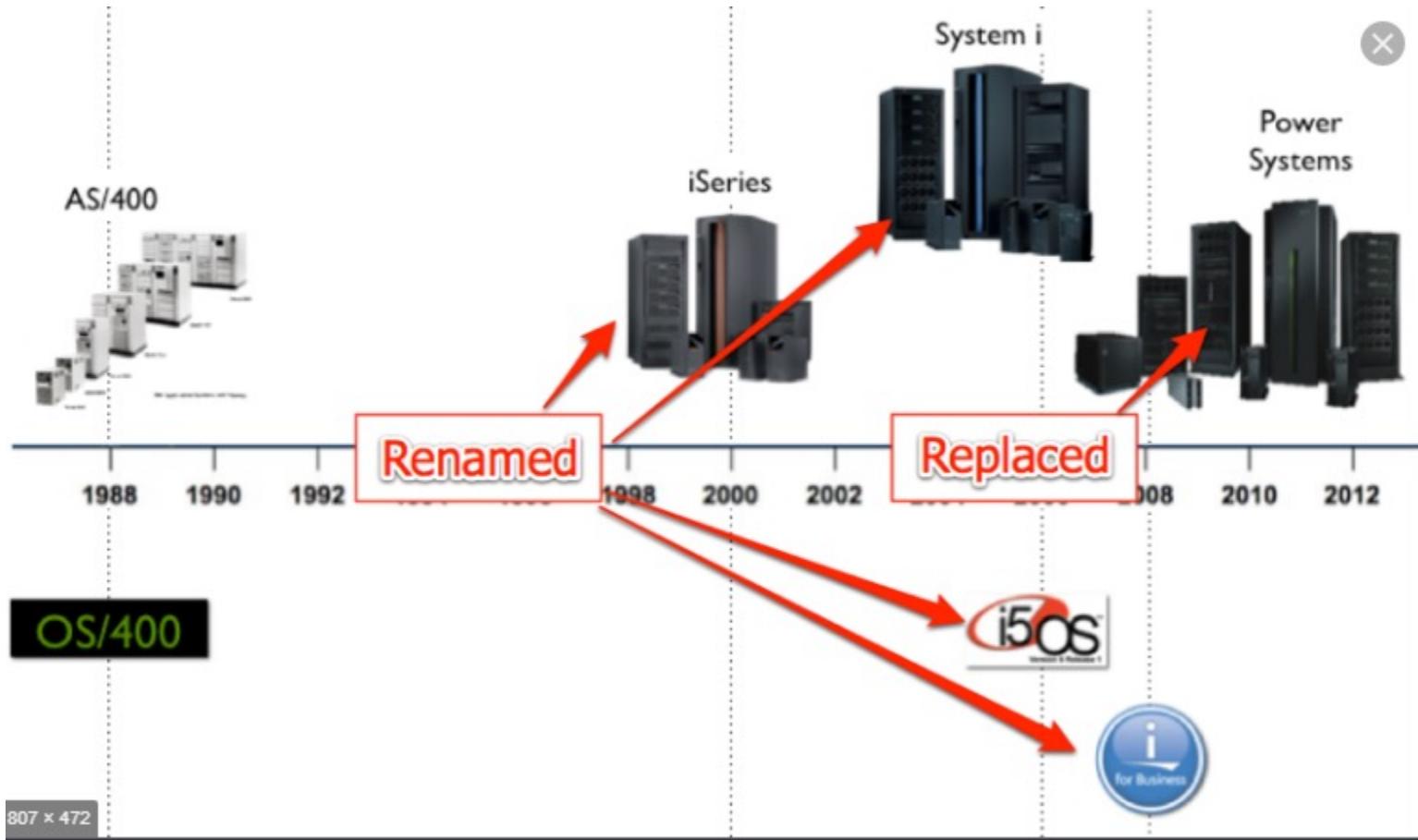


- ▶ AS/400 and iSeries are reference to older versions of the Hardware/Software
- ▶ Current Operating System is IBM i
- ▶ Current Hardware is POWER – Performance Optimization With Enhanced Risc
- ▶ You are working on an IBM i operating system on POWER

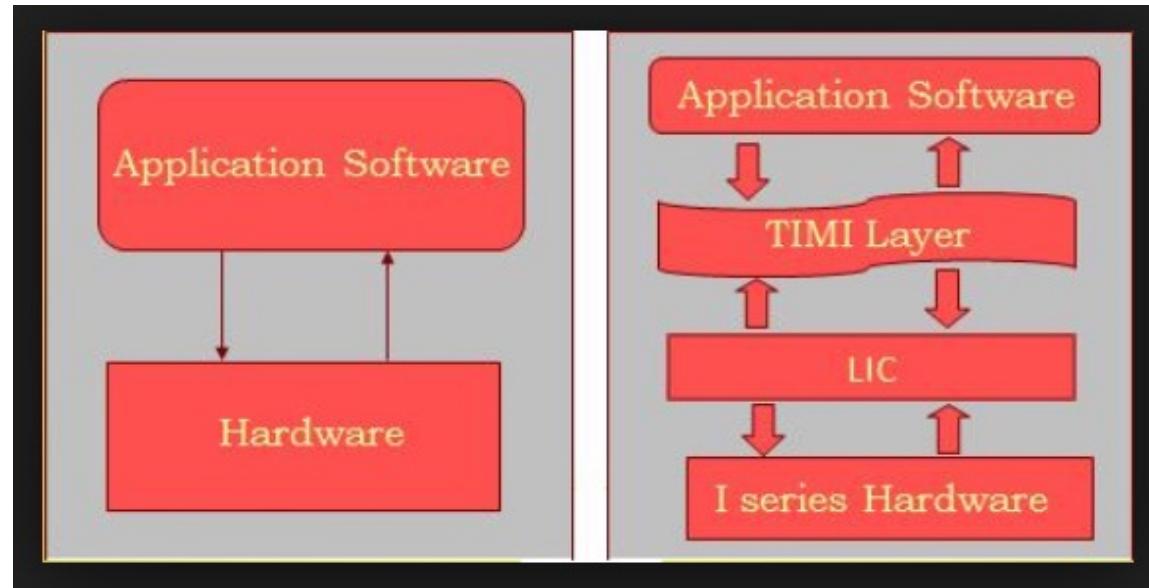
# Week # 1- History of AS/400



# POWER Systems Heritage

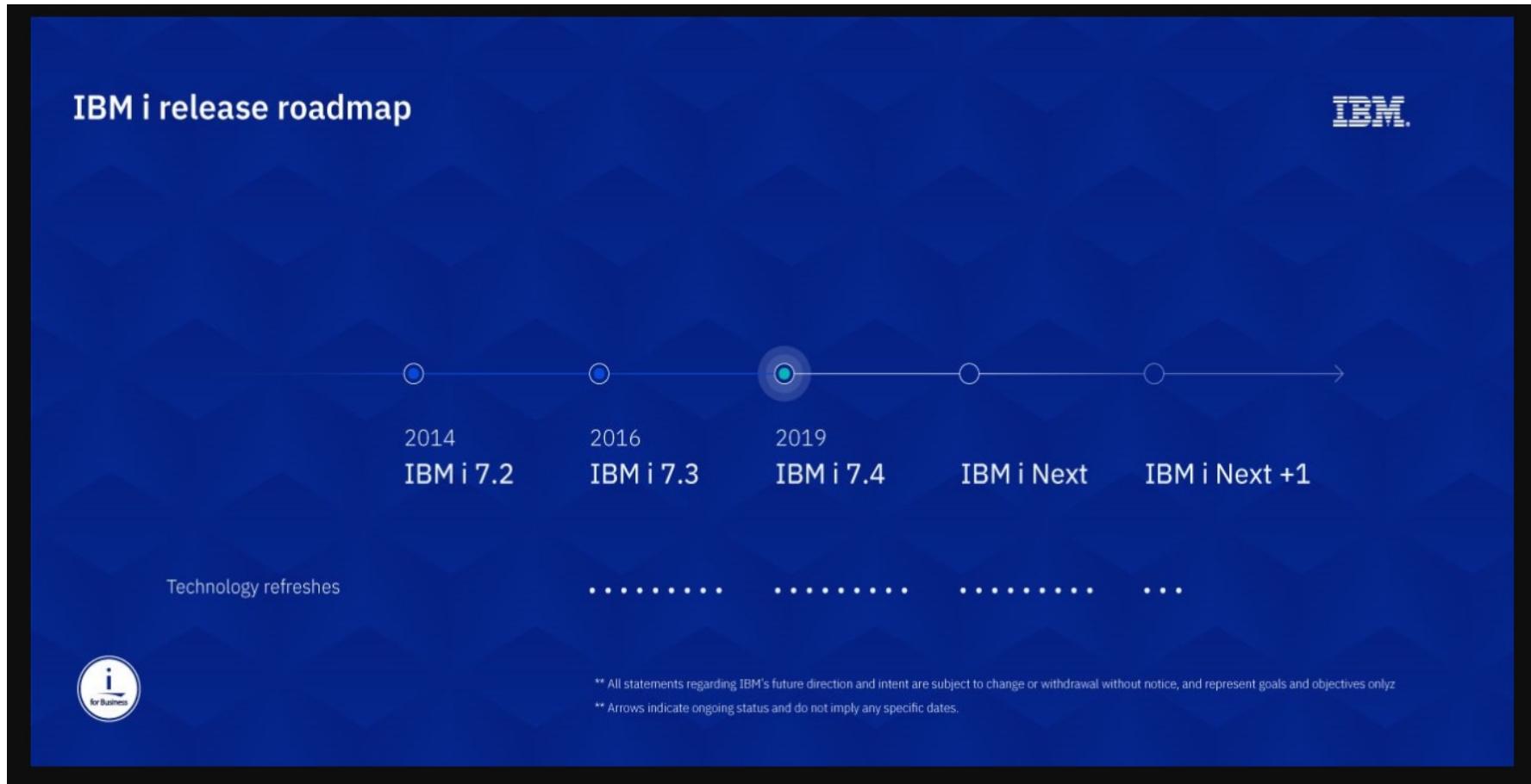


# Overview of the iSeries-AS/400 - The Architecture

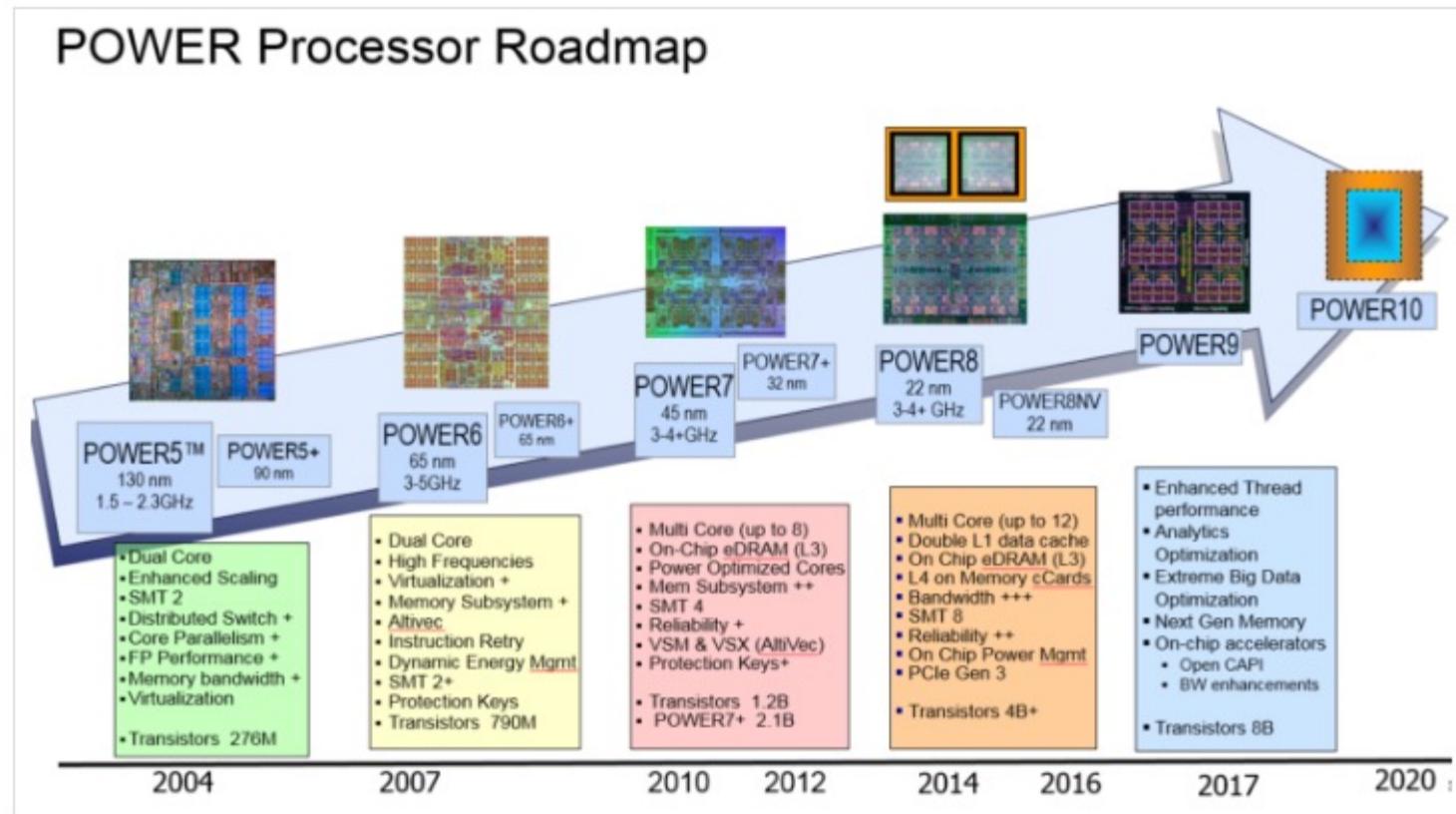


- Operating System
- Database
- Compiler
- Sub-System
- Hardware
- Software
- License Internal Programs (LIC)
- Logical Partitioning LPAR

# Overview of the iSeries-AS/400 - Server Roadmap



# Overview of the iSeries-AS/400 – Roadmap





# Our Machine - POWER9



- POWER9 is a family of superscalar, multithreading, symmetric multiprocessors based on the Power ISA announced in August 2016 at the Hot Chips conference.
- The current fastest supercomputer in the world, Summit, is based on POWER9, while also using Nvidia's Volta GPUs as accelerators.
- Summit or OLCF-4 is a supercomputer developed by IBM for use at Oak Ridge National Laboratory, which as of November 2018 is the fastest supercomputer in the world, capable of 200 petaflops

# Latest Features of IBM i



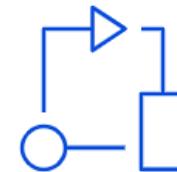
## Availability

- IBM Db2 Mirror offers continuous availability
- Downtime close to zero
- Get the job done 24 hours a day, 7 days a week, 365 days a year



## security

- Enhanced security features implement the latest standard practices
- Protect critical business data and applications
- New object level audit function



## Open source

- Standard Open Source environments
- Bring more apps to IBM i
- Easily integrate IoT, AI and Watson

# Overview of the iSeries-AS/400 – The Environment

## ▶ Native Environment

- Operating system: IBM I
- Database: DB2/400

## ▶ SQL

- Database: DB2/400

## ▶ AIX

- Integrated File Structure

## ▶ Linux

- Integrated File Structure

## ▶ Redbooks(Online Guide)

- <http://www.redbooks.ibm.com/redbooks.nsf/searchsite?SearchView&query=%22IBM+i%22>



# Overview of the iSeries-AS/400

- ▶ **Options & Function Keys are available to initiate tasks** (*demo*)
- ▶ **Alternate Sign-on Access is an option of the Operating System** (*demo*)
- ▶ **Navigation is typically via Menus and/or the Command Line** (*demo*)
- ▶ **Operations Navigator is a GUI Interface to the iSeries platform** (see <http://www.ibm.com/eserver/iseries/navigator/>) (*demo*)
- ▶ **Environments (Sub-systems) are created to run Jobs** (*web*)

# Overview of the iSeries-AS/400

- ▶ OS/400 also supports **S/36** & **S/38** O/S environments (former release levels)
- ▶ Objects on the iSeries are identified by their **TYPE** (*web*)
- ▶ CL Commands (provided by OS/400) allow user tasks to be run (*demo*)
- ▶ **Text-based HELP panels** are always available thru **F1** (*demo*)

# Overview of the iSeries-AS/400

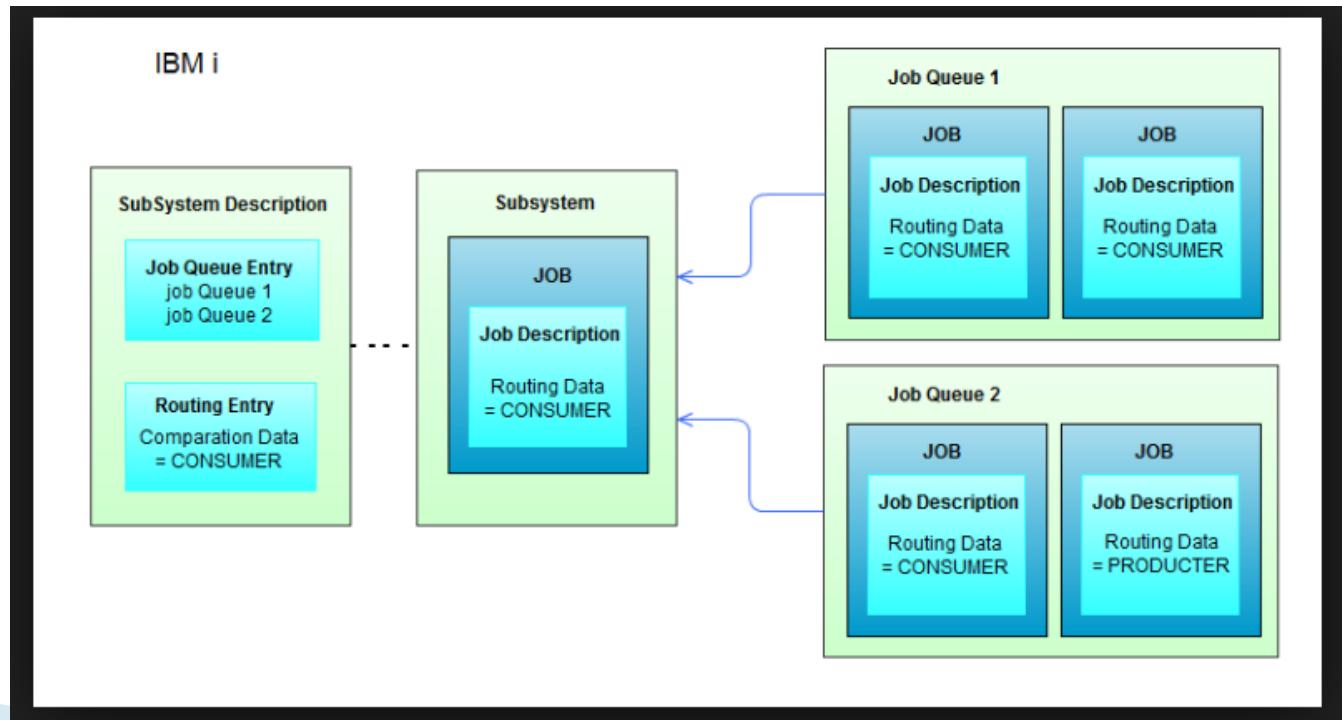
- ▶ Rational Developer for system i (RDI)
  - Development Environment
    - Download from ACS site
- ▶ Client Access
  - Production Environment
    - Download from ACS site
  - Downloads available at:
    - [Seneca ITS website \( iseries tab\)](#)
- ▶ Models
  - [https://www.ibm.com/support/knowledgecenter/en/POWER5/iphc5/iseries\\_modelnumbersandnames.htm](https://www.ibm.com/support/knowledgecenter/en/POWER5/iphc5/iseries_modelnumbersandnames.htm)

# Commonly Used Function Keys

- ▶ F1 = Help
- ▶ F2 = Extended Help
- ▶ F3 = Exit
- ▶ F4 = Prompt
- ▶ F5 = Refresh Screen
- ▶ F9 = Retrieve Previous Command
- ▶ F12 = Cancel
- ▶ F23 = More options
- ▶ F24 = more function keys

# Week # 1 – Sub Systems

- ▶ All jobs are run in areas of the computer called Sub systems.
- ▶ A Sub system is where the system brings together the resources needed to process work.
  - Sub system characteristics determine how the system uses resources within the Sub system.
  - The AS/400 operating system supports multiple Sub systems that can be User-defined, each having a separate Sub system description.



# Week # 1 – Sub Systems (continued)

- ▶ Some attributes of Sub systems whose values are defined in the Sub system description include:
  - Sub system name **Qinter**, **Qbatch**, **Qspl**
  - How many jobs can run in a Sub system at one time
  - Which storage pools the Sub system will use
  - Which job queues the Sub system will work from

# Week # 1 – Sub Systems (continued)

- ▶ Different Sub systems are necessary because of the many different types of jobs with different characteristics and often conflicting needs.
- ▶ The system administrator/root admin can tailor the existing Sub system descriptions and create new Sub systems to handle the needs of different types of jobs.
- ▶ Within Sub systems, individual jobs can be prioritized to begin execution sooner or later and, after they begin, can be given a higher or lower runtime priority.

# “What is a Job ?”

- ▶ A “job” is any and every piece of work on the AS/400.
- ▶ There are two types of jobs:
  - Interactive jobs
    - Login
    - Running something interactively
  - Batch jobs
    - Compile a program
    - Run a report
    - Submit overnight backup

# “Interactive Jobs”

- ▶ A job that begins when a user signs on to the system and ends when they sign off.
- ▶ It is a job with interaction between the user and IBM i, similar to a conversation ( a polite conversation!).
- ▶ Interactive jobs run in subsystem *Q/INTER*
- ▶ Terminates when the user signs off the AS/400 or the job has ended
- ▶ Runs in conversational mode (i.e., dialogue of sorts between user and program, utility, or operating-system function)

# “Batch Jobs”

- ▶ A job that runs in the *background*.
- ▶ They are generally jobs that use a lot of resources and are lower priority than **interactive jobs**.
- ▶ Usually started by **interactive jobs** e.g. a program compile
- ▶ **Batch jobs run in subsystem QBATCH**
- ▶ Each batch subsystem can execute only a limited number of batch jobs concurrently (This is programmable).
- ▶ Depending on the settings, a batch job can start right away or wait it's turn in the queue.

# “Batch Jobs”

## Batch Jobs:

- ▶ Can execute without user intervention
- ▶ Do not require data or any other information to be input through the workstation once they have started
- ▶ Are sent to a job queue until they can begin execution. A job queue is a staging area, managed by the Sub system, where batch jobs wait in line for their turn at processing.
- ▶ A typical batch job submission would be a report program or a program compile.
- ▶ If such a program were run interactively, the DASD (Direct Access Storage Device, or hard disk) access time required could cause the program to run for a long time, locking up the interactive session.

# Week # 1 – Types of Jobs (continued)

- ▶ To minimize disruption of work flow, certain tasks during an interactive session can be sent as batch jobs --
  - Programmer could submit a compilation or report as a batch job from the interactive job
  - While the submitted job runs in a batch subsystem, the programmer could go on to other tasks.

# Week # 1

## Types of Jobs (continued)

- ▶ An active job can be identified by the **Qualified Job Name**. A Qualified Job Name is made up of three distinct parts:
  - **Job Name** > based on the Terminal I.D.
  - ▶ - **User I.D.** > The User I.D. that initiated the job.
  - **Job Number** > assigned by the system (For a batch job it is the program name)

# Work With Active Jobs

- ▶ Command is **WRKACTJOB**
- ▶ Shows you all the jobs that are currently running and their status.
  - Like Windows Task Manager

# Commands in AS/400

- ▶ Noun + Verb
- ▶ Such as WRK + ACTJOB or DSP + USRPRF
- ▶ First part is the action + Next part is the command to search for specific item
- ▶ Some actions are:
  - WRK, DSP, PRT, DLT, CHG, RMV, ADD, EDT etc etc
  - WRK\* will bring all commands using a wildcard “\*”
  - Or DSP\* etc etc on the command line
  - Go cmdwrk Go cmddsp etc etc

# Week # 1

## OS/400

- ▶ OS/400 is the AS/400's operating system
- ▶ It is a robust, complex, functionally rich set of programs
  - It Controls traditional computer system functions.
  - It Incorporates features that normally require separate software components
  - It supports two other operating systems – System/36 and System /38

# Week # 1

## OS/400 (continued)

All AS/400s are shipped with basic OS/400 support, including predefined system settings for work management functions

System Values **WRKSYSVAL** or **DSPSYSVAL**

# Week # 1

## OS/400 (continued)

OS/400 is an object-based operating system:

- ▶ An object is anything on the system that has a name and takes up space in storage.
- ▶ A large number of objects are supplied by IBM through OS/400, and they typically have names beginning with "Q". Other objects usually are named according to shop naming convention.
- ▶ The system locates an object by its name.

# Week # 1

## OS/400 (continued)

Objects are grouped into types, and an object type determines how the object is used on the system.

Common types include:

- \*PGM - Programs
- \*FILE - Files
- \*CMD - Commands
- \* LIB - Library

Other types also include user-profile objects and subsystem-description objects.

Object type is always assigned by the system and is determined by the command used to create the object.

# Week # 1

## Control Language

OS/400 provides a single, consistent user interface to its functions through Control Language (CL) commands.

- ▶ CL is flexible, powerful, and allows direct access to OS/400 functions.
- ▶ More than 1,500 commands are available.
- ▶ Each command is an object on the AS/400.

# Week # 1

## Control Language (continued)

Most CL commands consist of a command name and one or more command parameters. A Command Parameter has an associated value, specified along with a command, that controls and limits the operation of the command and names the files, programs, or other objects the command will work on.

# **Week # 1**

## **Control Language (continued)**

Individual commands can be entered on a command line.

**A command line is a line beginning with the symbol ==> that appears near the bottom of certain types of display screens.**

# Week # 1 – System Values

System values are control and configuration attributes that let you customize certain operating-system functions.

- They define critical aspects of the environment and general rules that jobs must follow.
- They are not objects.
- They describe characteristics of the system that can be displayed or changed with CL commands.
- Many come preset or others need to be set.
- WRKSYSVAL or DSPSYSVAL commands

# System Values (*demo*)

- ▶ Data Used to configure the power system for our business needs
- ▶ Default pre-loaded System Values
- ▶ Using the command PRTSECATR to review Default/Recommended values by IBM
- ▶ Tune your system according to your company policies/security audit

# User Profiles

- ▶ Each User ID has a **User Profile** which describes the user and their authorities
- ▶ Contains information such as Current Library, default output queue, password, class of user

# Queues

- ▶ A **queue** is a line-up! A place where things wait.
- ▶ Examples of IBM i queues:
  - Job Queues: Where batch jobs wait
  - Output Queues: Where spool files wait to print
  - Message Queues: Where messages wait

# “Objects”

- ▶ Any thing on the system that takes up space in “storage”
- ▶ On Unix/Windows, everything is a file
- ▶ On iSeries, everything is an **object**
- ▶ On Windows, files have extensions (.txt, .doc, xls, .ppt)
- ▶ On iSeries objects have **types**
- ▶ Common **object types** include:
  - libraries, files, job, queues, programs

# Library List

- ▶ Like Windows path
- ▶ Consists of System, User and Program libraries
- ▶ DSPLIBL, ADDLIBL, RMVLIBLE, EDTLIBL, CHGURLIB

Portion	Values/Command	Contents
System Library	QSYS LIBL	QSYS 1-15 libraries
Product Library	Optional	
Current Library	CHGURLIB	From User Profile
User Library	QUSRLIBL	QTEMP 1-25 Libraries

# AS/400 Main Menu – Key Items

- ▶ Menu Name
- ▶ Menu ID
- ▶ System ID
- ▶ Options
- ▶ Function Keys
- ▶ Command Line
- ▶ Message Line

## iSeries: OS/400 – Main Menu

MAIN

OS/400 Main Menu

System: S101450F

Select one of the following:

1. Usertasks
2. Office tasks
3. General system tasks
4. Files, libraries, and folders
5. Programming
6. Communications
7. Define or change the system
8. Problem handling
9. Display a menu
10. Information Assistant options
11. iSeries Access tasks
90. Sign off

Selection or command

====>

F3=Exit F4=Prompt F9=Retrieve F12=Cancel F13=Information Assistant

F23=Set initial menu

Type option number or command.

# Download Mocha Soft for using AS/400 Emulation TN5250

- ▶ <http://mochasoft.dk/>
- ▶ Download TN5250.msi file for Windows



## Download MochaSoft software for Windows 7/8/10 and Vista + XP

Windows 7/8/10	Version	File (msi format)	Size	Overview
Mocha TN5250	3.5	<a href="#">tn5250.msi</a>	2.1 MB	<a href="#">versions</a>
Mocha TN3270	3.1.1	<a href="#">tn3270.msi</a>	1.2 MB	<a href="#">versions</a>
Mocha Telnet	2.3	<a href="#">telnet.msi</a>	1.1MB	<a href="#">versions</a>
Mocha TN3812	1.4	<a href="#">tn3812.msi</a>	1.05MB	<a href="#">versions</a>

XP with .NET 4.0	Version	File (msi format)	Size	Overview
Mocha TN5250	2.6	<a href="#">tn5250xp.msi</a>	1.1 MB	<a href="#">versions</a>
Mocha TN3270	2.2	<a href="#">tn3270xp.msi</a>	1.2 MB	<a href="#">versions</a>
Mocha Telnet	1.7	<a href="#">telnetxp.msi</a>	1.02MB	<a href="#">versions</a>
Mocha TN3812	1.2	<a href="#">tn3812xp.msi</a>	1.05MB	<a href="#">versions</a>

The XP versions uses only .NET 4.0, it allows only TLS 1.0 . New versions for Windows 7/8/10 requires .NET 4.5 as to support TLS 1.1 and TLS 1.2

## Lecture 2 iSeries System Security

### iSeries Security System

- The iSeries security system is built into the operating system, allowing for consistent security between the operating system and other licensed programs. (There are several software components available from IBM that extend the functions and capabilities of the system - licensed program product).
- Security has three separate aspects:
  - 1 - Physical security of the hardware
  - 2 - Backup of the data files
  - 3 - Prevention of unauthorized access to the data files.

- System values, security levels, assistance levels, user profiles, group profiles, and authorization lists work together to allow the manipulation and control of data on the iSeries.
- Commands to use WRKSYSVAL, DSPSYSVAL
- WRKSYSVAL use Option 5 to display the value
- List type of Security Value to filter on \*ALL, \*SEC, \*DATTIM etc

#### . Security System Values

QPDMINLEN	QPDMAXLEN	QPDEXPITV
QDSPGNINF	QMAXSIGN	QMZSGNACN
QLMTDEVSSN	QINACTIT	QINACTMSGQ
QDSCJOBITV	QUPSMGQ	QUPSDLYTIM
QPWRSTIPL	QSECURITY	

#### . Security Levels

- System i supports five security levels. QSECURITY=10,20,30,40,50
- DSPSYSVAL (QSECURITY)

#### . Assistance Levels (QASTLVL)

- \*BASIC \*INTERMED \*ADVANCED
- If the user signs off the system, the current assistance level for each display remains stored until the user signs on and changes it.

#### . User Profile (\*USRPRF) and Object Authorities

- The user profile is an object that defines system access for the user: what objects can be accessed, what libraries can be used, what authorities are assigned, and what special groups the user belongs.

- **DSPUSRPRF (F4 , F1)**
- The Current library is where any new objects that the user create reside by default.

- User classes:

\*SECOFR \*SECADM \*PGMR \*SYSOPR \*USER

- **Each user profile class has special default authorities based on the security level.**

- Each object has authorities attached to the object.

\*ALL \*CHANGE \*USE \*EXCLUDE

- **A group profile (\*GRPPRF) is similar to a user's profile except it gives the same set of authorities to multiple users.**

#### **. Job Descriptions (\*JOBD)**

- **A job description includes attributes such as where the job is executed, the priority of the job, the printer to be used, and how message logging is to be handled.**

- **DSPJOBD F4**

- Jobq attached to Sub-system

#### **. Outq Output Queue**

- Outq attached to printer

#### **. Message Queue**

- Message queue is not attached to anything

#### **. Library List**

- The library list provides an effective method to help program locate objects on the system. (An Example)

- DSPLIBL
- CHGURLIB
- ADDLIBL
- RMVLIBLE
- CHGLIBL
- EDTLIBL

**Let's create a new Library C436nn where nn is your login ID number**

**Add this library in your list**

**Make this library your current library**

**Change position of this library up/down of QGPL or QTEMP**

## **Lecture 3     The User Interface / CL Commands / Message Commands / Spool File / Jobs**

- Four different types of screens:

- . menu screen
- . list screen
- . entry screen (command prompt screen)
- . information screen

- CL commands can consist of a verb and a noun or a verb, an adjective and a noun. Abbreviations are used to construct CL commands. Vowels are rarely used in a CL command.

WRK    CHG    DSP    CRT    DLT    CPY    OBJ    STR    STS    SYS    WTR

Or use the Wildcard like WRK\* or DSP\* to see all the commands

- A CL command has two kinds of parameters: **required** parameter and **optional** parameter.

- CL Keyword Notation

Command Name    Keyword (Value) Keyword(Value) Keyword(Value)

. The parameters can be in any order.

. Function key **F11** is very useful to view your keyword for a command

= = = > WRKMSG MSGQ(userlib/userid) OUTPUT(\*)

- CL Positional Notation

. When parameter values are entered by position, they must be entered in the order in which they are specified within the command syntax.

. **The F4 prompt lists the parameters in sequence.**

= = = > WRKMSG userlib/userid \*

- Combination of keyword and positional notation

. The position parameters must occur first, once keyword notation is used, positional notation is no longer valid, and any additional parameters must be specified in keyword notation.

= = = > WRKMSG userlib/userid OUTPUT(\*)

Qualified Command vs Non-Qualified Command

- When you specify a command with library, it is qualified like call mylib/pgma
- When you specify a command without library, it is non-qualified like call pgma
- In a non-qualified command the system will go over your library list and search for pgma

Sending Messages in iSeries

- **SNDMSG MSG(WRKACTJOB)**
- **SBMJOB JOBNAME(MYJOB1) SCDDATE(122521) SCDTIME(230000)**
- The above will run the results of Wrkactjob command on Dec 25, 2018 at 23 hundred hours meaning at 11 pm.
- To check your job if it is scheduled or not, run the command WRKUSRJOB, then press F11 to look at schedule date/time

Display Job Log information

- **DSPJOBLOG output(\*) will display on screen**
- **DSPJOBLOG output(\*print) will print a spool file**

Spool File

- **Spool file is the outcome of a job that is completed or ended**
- **WRKSPLF command is used to check your spool file**
- You can run various options to change, delete, display, print, send etc your spool file
- **To delete all your spool files**, use the command **DLTSPLF \*select** (Meaning it will delete all your spool files)
- Always press **F5= Refresh to refresh your screen after running any command**

- Submit a Job
- **-Sbmjob**
- Looking at your job
- **-Wrkusrjob**
- **F11** is for **Keywords**
- **F9** is for **retrieve**
- **F5** is for **Refreshing** your screen
- Spool files
- **-Wrksplf**
- Sending messages
- **-Sndmsg**
- Display messages
- **-dspmsg**
- Creating Jobq
- **-Crtjobq**
- **-Wrkjobq**
- **-Addjobqe** To attach your Jobq with Sub-System
- Creating Outq
- **crtoutq**
- **wrkoutq**



## BCI433-S1A

### Lecture 4 Working with Jobs and Message Handling and Intro to SEU

#### -**SBMJOB**

.The purpose of this command is to control scheduling the execution of a program or a command on a one-time basis.

Command to run, Optional fields: Job Name, Jobq, Outq, Schedule Date and Time

.Qualified Job Name: job name, user name, job number

.Schedule Date and Time Parameters: SCDDATE SCDTIME

#### -**WRKJOBSCDE**

.The Job Scheduling Entry contains the information you need to submit a batch job at regular intervals. Adding a job schedule entry will cause a job to be submitted at the specified time.

.Change Remove Hold Release Display Submit

-Work with Jobs: GO ASSIST Option 2

-**WRKJOBQ** Hold Release

-Work with Signed-On Users: GO ASSIST Option 10

#### -Message Handling

.Informational message or Inquiry message are sent to QSYSOPR (the system operator's message queue or a user's message queue (the same name as the user ID) or the workstation's message queue (The same name as the workstation)

. Message ID

. WRKMSG

Delivery mode: \*BREAK \*NOTIFY \*HOLD \*DFT

Severity code: 0--99

. CHGMSGQ F4 F10

. DSPJOBLOG F10 F17

STRPDM is used for Programming (PDM stands for Programming Development Manager)

SEU is the Editor Source Entry Utility

Source File is used like a container to create members and/or programs within a source file

CRTSRCPF is the command

Source File Information

Source File (Like a container)

-ZnnSRCFILE

- Program1

- Program2

- Program3

- C++ Source File

- Mypgma (Also known as members or programs)

- o Mypgmb
- o Mypgmc

- C Source File

- Mypgmb

- Java
  - Mypgmc
- RPG
  - MyRPG program
- Cobol

SrcC++ (Like a container)

- Mypgma only c++

SrcJava (Like a container)

- Mypgmb only Java

SrcC (Like a container)

- Mypgmc only c

Run the command **Crtsrcpf znnsrcfile** in our library (nn is the number in your profile CE434Bnn)

#### Steps

- 1 – Strpdm
- 2 – Take Option 3
- 3 – Enter your source file that you created like znnsrcfile in your library

## **Strseu shortcut commands**

Insert I

Delete D

Delete Delete DDnn where nn stands for the number of lines

Repeat RPnn where nn stands for the number of lines

Move M

Copy C

Exclude Xnn

After A

Before B

Save

Find

Change

**Create QCLSRC – crtsrcpf qclsrc**

**Create QCMDSRC - crtsrcpf**

Use **wrkobj** command to find objects

Monitor Message

## **Lecture 5**

### **Managing Physical and Logical Files**

AS/400 Database is called DB2/400

Physical Files (PF) hold data in it - Parent

Logical Files (LF) are view to the data - Child

Physical File can have fields defined in it such as Customer Master File example below:

Cusmas (File Name)

Cusnbr (Field 1 called Customer Number) that is 10 Packed Numeric

Cusnam(Field 2 called Customer Name) that is 30 Alpha

Etc

Some of the commands that you will need to use are as follows:

#### **CRTPF Create Physical File, this command does not create any fields**

If you want to create PF with records you need to create a DDS source. Data Description Source.

So we will create a source file CRTSRCPF QDDSSRC in your library and then create multiple PF in it.

For Logical File with key such as Customer Number or City or Phone No, we can create a source also in QDDSSRC file

**DSPDBR** command will be used to see the relationship between PF and LF.

Each PF can have one or multiple LF attached to it.

If you wish to delete a PF, you need to delete all the LF files first.

Once we have the PF file created we can use **STRDFU** Start Data File Utility to Add/Change/Delete records.

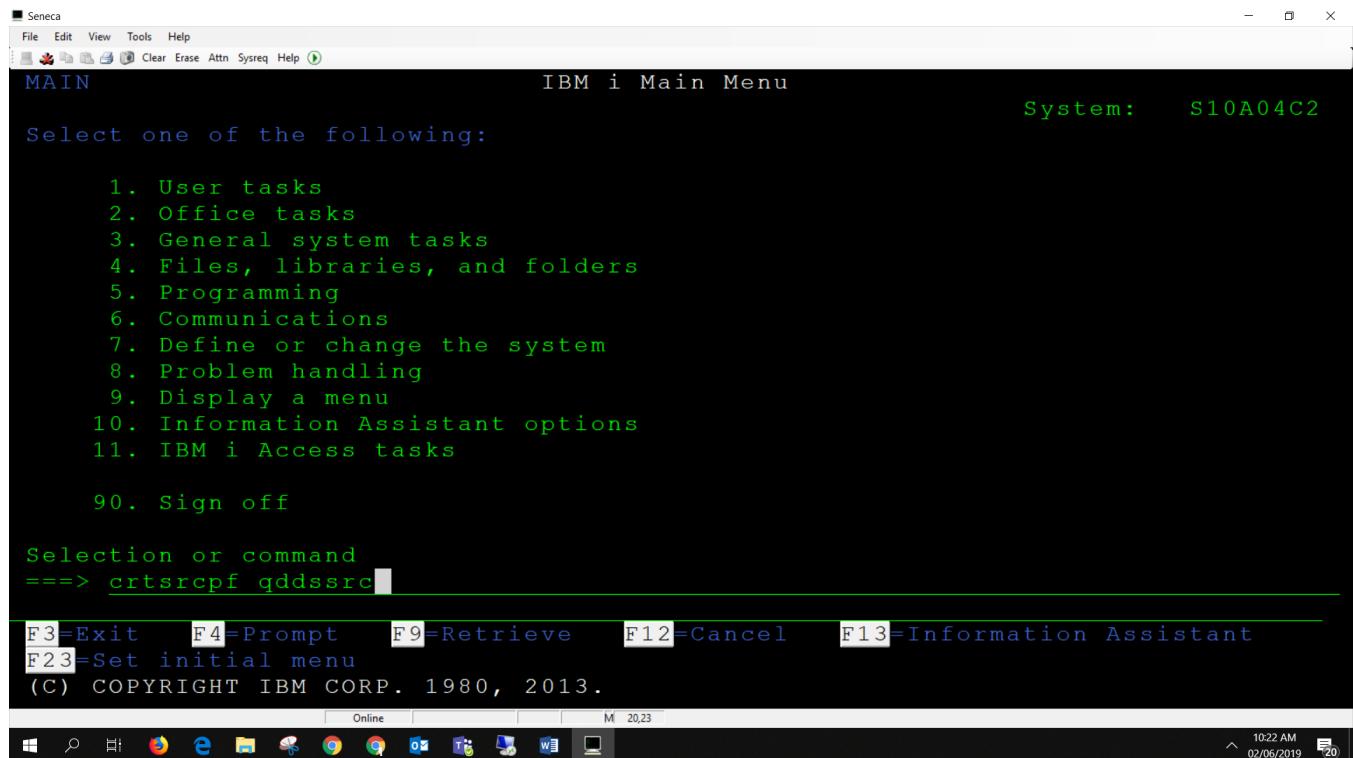
#### **STRDFU is provided by IBM as a default utility, also known as Data or Dirty File Utility**

You can run STRDFU and take option 5 or run UPDDTA and then file name, either one will take you to the same screen

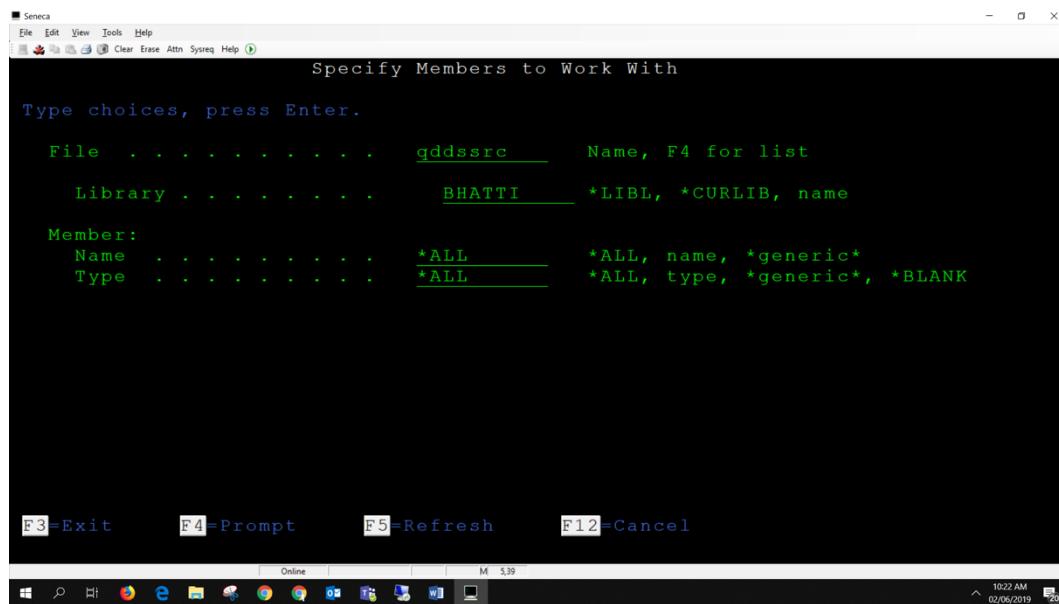
Once you have some records in your file, then you can use DSPPFM Display Physical File Member or RUNQRY Run Query command to see the records

Below are steps to create a new Customer Master PF

## 1 – Crtsrcpf QDDSSRC in your library



## 2 – STRPDM, option 3, then type QDDSSRC and your library



## 3 – Then press F6 and create a new member for PF

4 – Now type the below syntax

Seneca

File Edit View Tools Help

Clear Erase Attn Sysreq Help

Columns . . . : 1 71 Edit BHATTI/QDDSSRC

SEU==> CUSMAS

FMT PF .....A.....T.Name+++++RLen++TDpB.....Functions+++++++=\*\*\*\*\*

\*\*\*\*\* Beginning of data \*\*\*\*\*

0001.00	A	R	CUSMASR	
0002.00	A	CUSNBR	10P	TEXT('CUSTOMER NUMBER')
0003.00	A	CUSNAM	20A	TEXT('CUSTOMER NAME')
0004.00	A	CUSADR	20A	TEXT('CUSTOMER ADDRESS')
0005.00	A	CUSPOS	6A	TEXT('CUSTOMER POSTAL')
0006.00	A	CUSTEL	10A	TEXT('CUSTOMER PHONE')

\*\*\*\*\* End of data \*\*\*\*\*

F3=Exit F4=Prompt F5=Refresh F9=Retrieve F10=Cursor F11=Toggle  
F16=Repeat find F17=Repeat change F24=More keys

(C) COPYRIGHT IBM CORP. 1981, 2013.

Online M 29

10:23 AM 02/06/2019

5 – Save/Exit and compile your PF using option 14 to compile. Use wrkobj cmas command to see if the object is created

Seneca

File Edit View Tools Help

Clear Erase Attn Sysreq Help ⓘ

Work with Objects

Type options, press Enter.

2=Edit authority	3=Copy	4=Delete	5=Display authority	7=Rename
8=Display description	13=Change description			

Opt	Object	Type	Library	Attribute	Text
I	CUSMAS	*FILE	BHATTI	PF	Customer Master File

Bottom

Parameters for options 5, 7 and 13 or command  
====>

---

F3=Exit F4=Prompt F5=Refresh F9=Retrieve F11=Display names and types  
F12=Cancel F16=Repeat position to F17=Position to

Online M 8,2

10:24 AM 02/06/2019

## 6 – Now use STRDFU to add records. Take option 5

Seneca

File Edit View Tools Help

Clear Erase Attn Sysreq Help ⓘ

Data File Utility (DFU)

Select one of the following:

1. Run a DFU program
2. Create a DFU program
3. Change a DFU program
4. Delete a DFU program
5. Update data using temporary program

Selection or command  
====> I

---

F3=Exit F4=Prompt F9=Retrieve F12=Cancel (C) COPYRIGHT IBM CORP. 1981, 2007.

Online M 21,7

10:24 AM 02/06/2019

### Option 5

Type Cusmas file name

Seneca

File Edit View Tools Help

Clear Erase Attn Sysreq Help ⓘ

Update Data Using Temporary Program

Type choices, press Enter.

```
Data file . . . . . . . . . cusmas
Library . . . . . . . . *LIBL
Member . . . . . . . . *FIRST
```

Name, F4 for list  
Name, \*LIBL, \*CURLIB  
Name, \*FIRST, F4 for list

F3=Exit F4=Prompt F12=Cancel

Online M 5,40

10:24 AM 02/06/2019

### Add records

Seneca

File Edit View Tools Help

Clear Erase Attn Sysreq Help ⓘ

WORK WITH DATA IN A FILE

Format . . . . : CUSMASR

Mode . . . . : ENTRY

File . . . . : CUSMAS

```
CUSNBR: _____
CUSNAM: _____
CUSADR: _____
CUSPOS: _____
CUSTEL: _____
```

F3=Exit F5=Refresh F10=Entry F6>Select format  
F9=Insert F11=Change

Online M 5,11

10:25 AM 02/06/2019

```
Seneca
File Edit View Tools Help
Clear Erase Attn Sysreq Help ⓘ
WORK WITH DATA IN A FILE
Format . . . . : CUSMASR
Mode . . . . : ENTRY
File . . . . : CUSMAS

CUSNBR: 9001
CUSNAM: John Brown
CUSADR: 123 Address
CUSPOS: L9T8M4
CUSTEL: 9052576345

F3=Exit F5=Refresh F6>Select format
F9=Insert F10=Entry F11=Change

Online M 9,20
10:25 AM 02/06/2019
```

F3 to exit and see how many records you added or changed or deleted

```
Seneca
File Edit View Tools Help
Clear Erase Attn Sysreq Help ⓘ
End Data Entry

Number of records processed

Added . . . . . : 1
Changed . . . . . : 0
Deleted . . . . . : 0

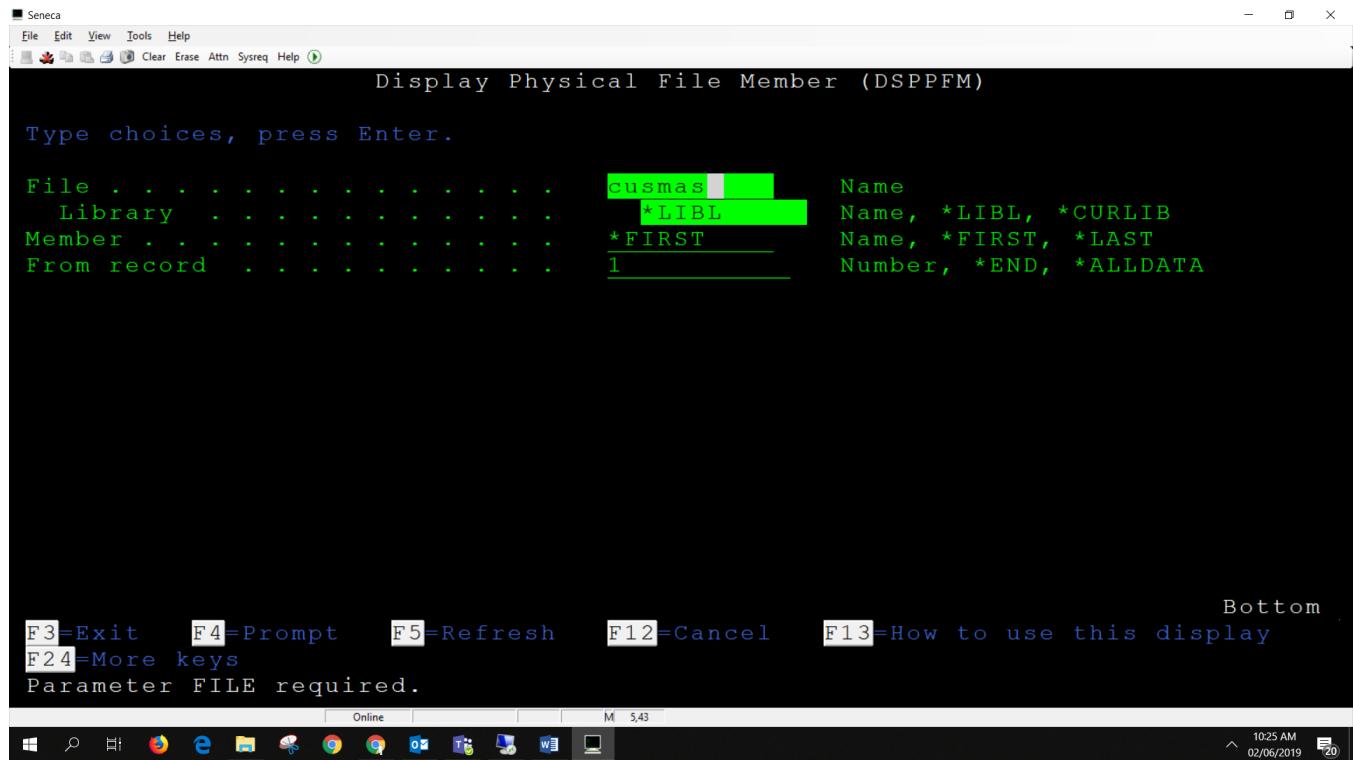
Type choice, press Enter.

End data entry . . . . . . Y Y=Yes, N=No

F3=Exit F12=Cancel
All records added, changed, or deleted will be printed.

Online M 14,37
10:25 AM 02/06/2019
```

Press F3 to come to the command line



**Run dsppfm cusmas command on the command line**

You can also use **runqry \*n filename** to view records. In some cases the Year field or any numeric field will not be displayed if you use DSPPFM.

Seneca

File Edit View Tools Help

Clear Erase Attn Sysreq Help ⓘ

Display Physical File Member

```
File . . . . . : CUSMAS Library . . . . . : BHATTI
Member . . . . . : CUSMAS Record . . . . . : 1
Control . . . . . : _____ Column . . . . . : 1
Find . . . . . :
* . . . 1 . . . 2 . . . 3 . . . 4 . . . 5 . . . 6 .
Azmat Bhatti 123 Valley Drive L9T 9052567893
Cindy Crawford 90 Hollywood Drive 90000 6789089876
Tim Hortons 874 Sinclair Road L6H6S79058767890
John Brown 123 Address L9T8M49052576345
***** END OF DATA *****
```

F3=Exit F12=Cancel F19=Left F20=Right F24=More keys

Bottom

Online M 4.23

10:26 AM 02/06/2019

7 – We will create one logical file called CusmasL1. Syntax is below. Use QDDSSRC to create a new member using F6 function key

Seneca

File Edit View Tools Help

Clear Erase Attn Sysreq Help ⓘ

Start Source Entry Utility (STRSEU)

Type choices, press Enter.

```
Source file . . . . . . . . . > QDDSSRC Name, *PRV
  Library . . . . . . . . . > BHATTI Name, *LIBL, *CURLIB, *PRV
  Source member . . . . . . . cusmasl1 Name, *PRV, *SELECT
  Source type . . . . . . . . lf Name, *SAME, BAS, BASP...
  Text 'description' . . . . . . Cusotmer Master Logical File 1
```

F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display F24=More keys

Bottom

Online M 9.67

10:34 AM 02/06/2019

Logical File will have reference to Physical File and Key

```

Seneca
File Edit View Tools Help
Clear Erase Attn Sysreq Help
Columns . . . : 1 71          Edit          BHATTI/QDDSSRC
SEU==>
FMT LF . . . . . T.Name+++++.Len++TDpB. . . . Functions+++++*****+
***** Beginning of data *****
0001.00          UNIQUE
0002.00          PFILE(CUSMAS)
0003.00          K CUSNBR
***** End of data *****

F3=Exit   F4=Prompt   F5=Refresh   F9=Retrieve   F10=Cursor   F11=Toggle
F16=Repeat find   F17=Repeat change   F24=More keys
(C) COPYRIGHT IBM CORP. 1981, 2013.

```

Save/Exit and compile

Run DSPDBR command to check relationship of PF and LF

```

Seneca
File Edit View Tools Help
Clear Erase Attn Sysreq Help
Work with Members Using PDM          S10A04C2
File . . . . . QDDSSRC
Library . . . . . BHATTI          Position to . . . .
Type options, press Enter.
2>Edit      3=Copy    4>Delete 5=Display      6=Print      7=Rename
8=Display description 9=Save 13=Change text 14=Compile 15>Create module...
Opt Member Type Text
CUSMAS PF Customer Master File
CUSMASL1 LF Customer Master Logical on Customer Number
JAVA1 JAVA Student Master File
SECTINQ DSFP RPG544EI Display file
SECTIONL LF Sectoins Logical File RPG544EI
SECTIONS PF RPG544EI Subfile DDS
STUMAS PF Student Master File
STUMASL1 LF Student Master Logical on Customer Number
More...
Parameters or command
==> dspdbr cusmas
F3=Exit   F4=Prompt   F5=Refresh   F6=Create
F9=Retrieve   F10=Command entry   F23=More options   F24=More keys

```

Seneca

File Edit View Tools Help

Clear Erase Attn Sysreq Help

Display Spooled File

Page/Line 1/18  
Columns 1 - 78

File . . . . . : QPDSPDBR

Control . . . . .

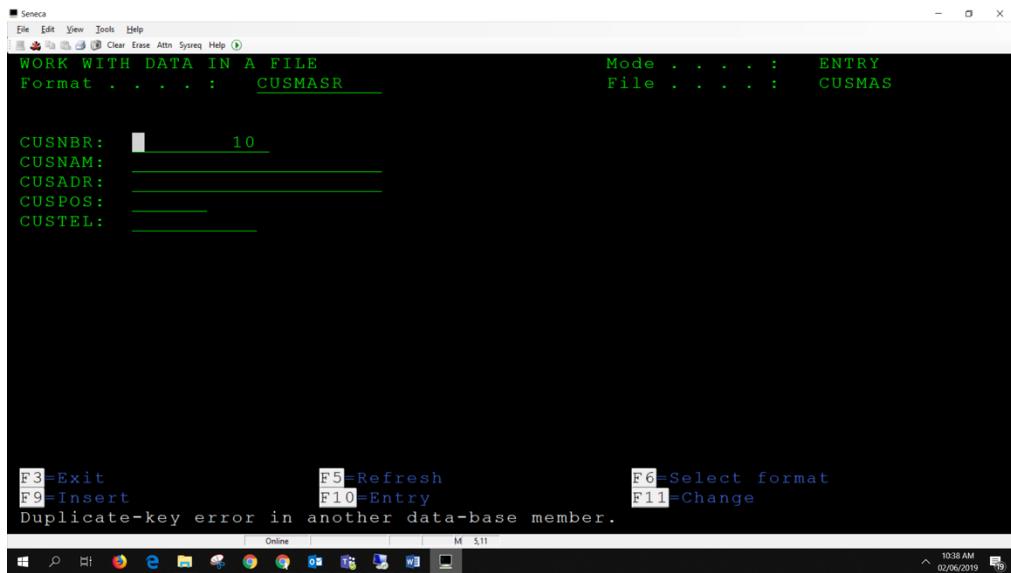
Find . . . . .

\* . . . . . 1 . . . . . 2 . . . . . 3 . . . . . 4 . . . . . 5 . . . . . 6 . . . . . 7 . . . . .

CUSMASL1 BHATTI Data

F3=Exit F12=Cancel F19=Left F20=Right F24=More keys

8 – Now we will run upddta cusmas and see if we can add duplicate records

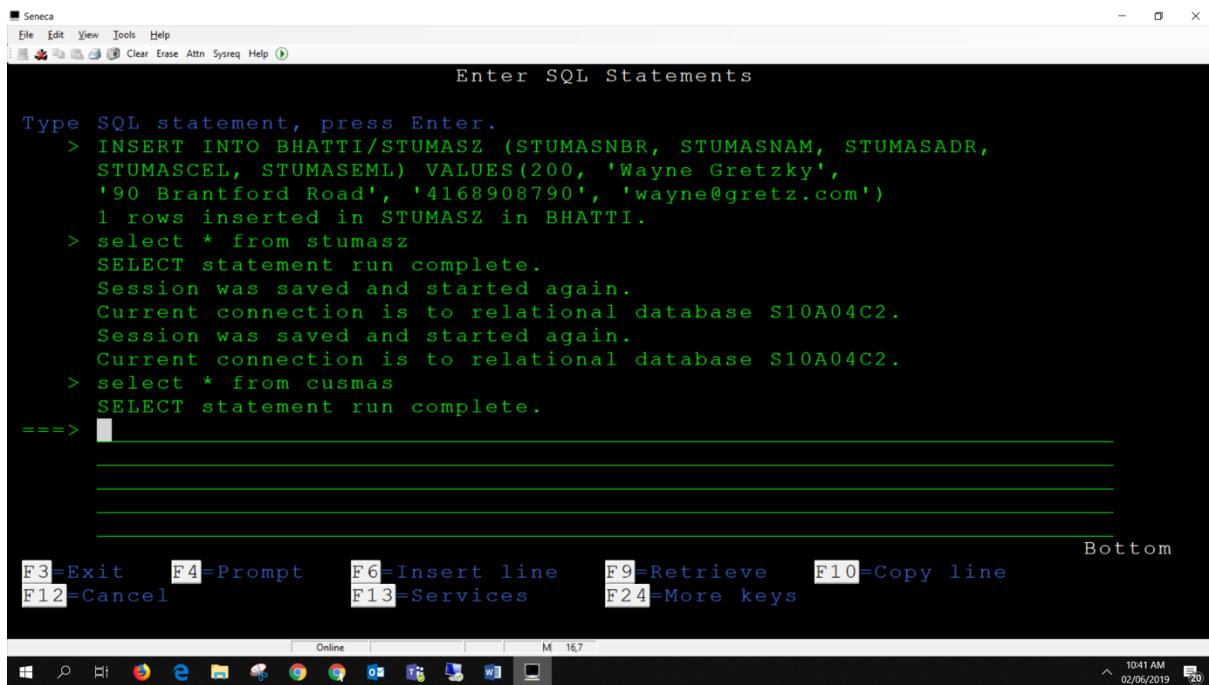


You should get a message like above, if you already have a record with Cusnbr 10, then you cannot add it again

9 – Next we will explore using **STRSQL Start SQL** commands and environment

True STRSQL on the command line

We will use **Select, Insert, Update, Delete commands in STRSQL**



Try using Function Keys to prompt and see how STRSQL works

Save your SQL session commands

## Lecture 6

1 - Create Physical File CARMAS using STRPDM and member in your QDDSSRC source file. Come up with at least 5 fields of your choice

- \*If you don't have the source file, use CRTSRCPF qddssrc to create the file.
- STRPDM -> option 3 -> change file to QDDSSRC, and left Name and type as \*ALL -> ENTER -> F6 to create new physical file (source type is pf)

```
Start Source Entry Utility (STRSEU)

Type choices, press Enter.

Source file . . . . . > QDDSSRC      Name, *PRV
  Library . . . . . > BHATTI        Name, *LIBL, *CURLIB, *PRV
Source member . . . . . carmas2       Name, *PRV, *SELECT
Source type . . . . . pf            Name, *SAME, BAS, BASP...
Text 'description' . . . . . Car Master File
```

- Once the file is created, you'll be redirect to the SEU where you can add fields by using insert prompt IP

```
Columns . . . : 1 71          Edit          BHATTI/QDDSSRC
SEU=>
FMT PF . . . A. . . . . T.Name+++++RLen++TDpB. . . . Functions+++++*****+
IP ***** Beginning of data ***** End of data *****
```

```
Columns . . . : 1 71          Edit          BHATTI/QDDSSRC
SEU=>
FMT PF . . . A. . . . . T.Name+++++RLen++TDpB. . . . Functions+++++*****+
IP ***** Beginning of data ***** End of data *****
```

0001.00	A	R	CARMAS2REC
---------	---	---	------------

```
Prompt type . . . PF          Sequence number . . . !!!!!!
Name                               Data           Decimal
Type      Name      Ref      Length     Type    Positions   Use
      CARYR      -        4          P        0          -
Functions
TEXT('CAR YEAR')
```

F3=Exit F4=Prompt F5=Refresh F11=Previous record

2 - Run STRDFU utility against (Car Master File) to add/change/delete records

- After STRDFU select option 5 to update data
  - Or you can use UPDDTA carmas to update data
    - select change mode and with page down you can browse through the records

3 – Add/Delete/Change records in CARMAS, say 4-5 records

## 4 – Use CARMAS to run SQL Statements using STRSQL utility

- basic CRUD functions

5 – Create Physical File VDRMAS using STRPDM and then use STRDFU utility (Vendor Master File). Come up with at least 5 fields of your choice

## 6 – Perform steps 2.4 for VDRMAS

## 7 - DSPFD Display File Description Command

## 8 - DSPPFM Display Physical File Member Command

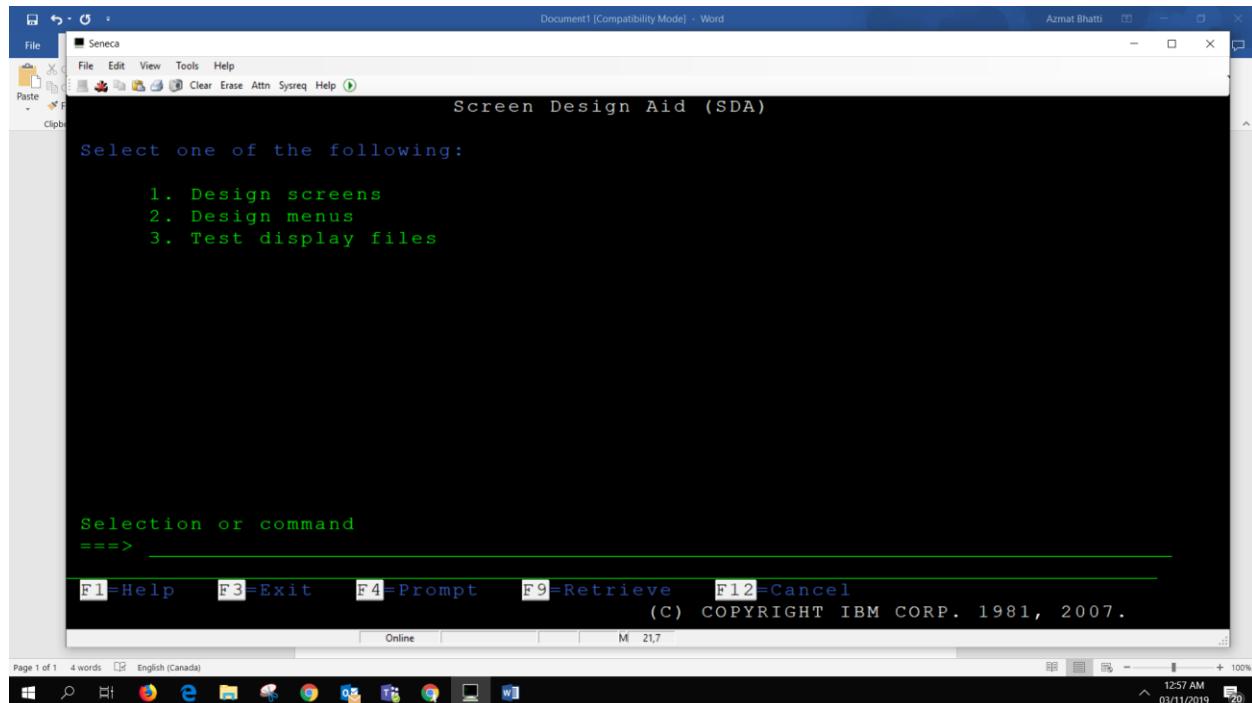
Commands to use:

- STRSQL, to start using SQL commands in AS/400
  - STRDFU - Try to use all available function keys and options
  - Select \* from CARMAS in STRSQL screen
  - Select \* from VDRMAS in STRSQL screen
  - Use Update/Delete commands in STRSQL, use F4 prompt where necessary
  - Runqry \*n CARMAS command to view Query Results for Customer Master File

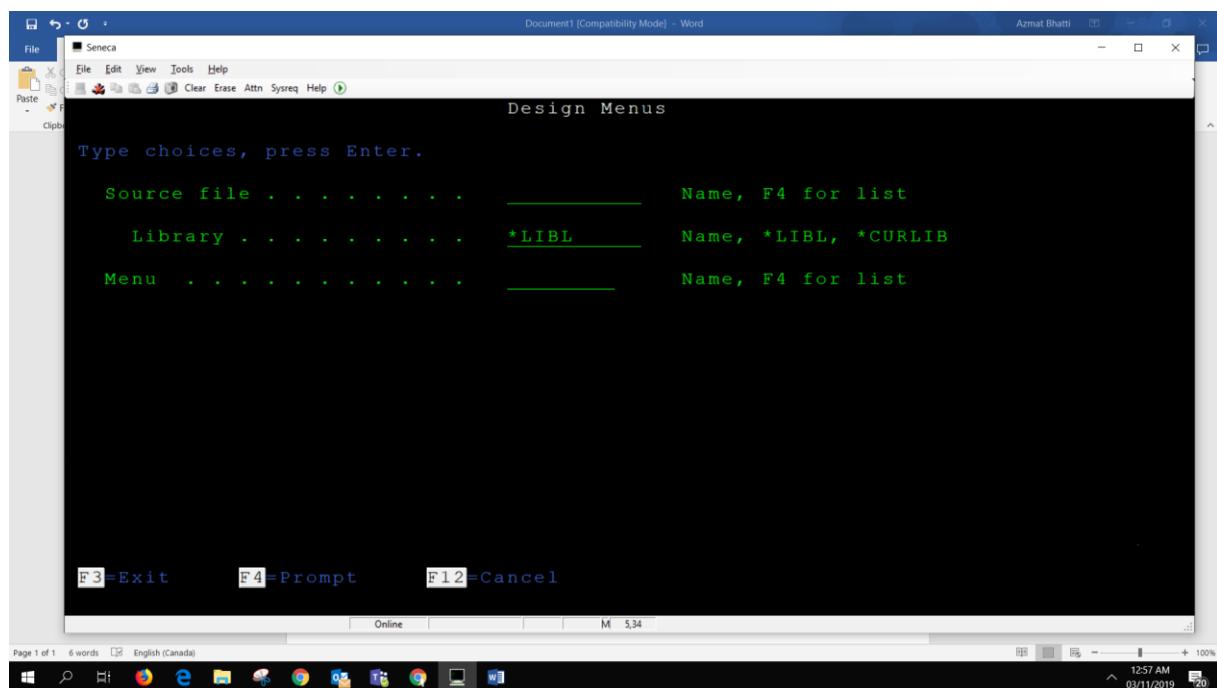
## Lecture 7 - Designing Menus

Lets go to the command line, then do the following:

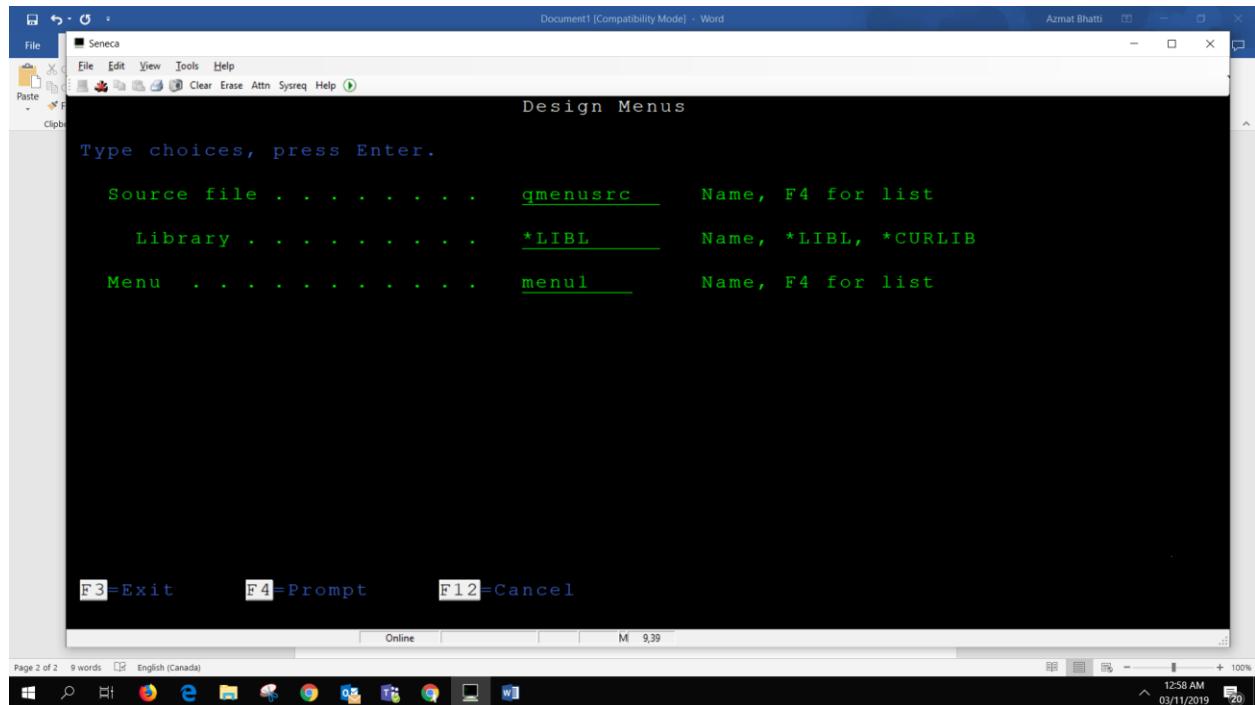
### 1 – STRSDA



### 2 – Option 2



3 – Type qmenuusr as a source file. You can use any source file name. Then menu1 will be your first menu.



Document1 [Compatibility Mode] - Word

Azmat Bhatti

File Seneca

File Edit View Tools Help

Paste Clear Erase Attn Sysreq Help

Type choices, press Enter.

Source file . . . . .	<u>qmenuusr</u>	Name, F4 for list
Library . . . . .	<u>*LIBL</u>	Name, *LIBL, *CURLIB
Menu . . . . .	<u>menu1</u>	Name, F4 for list

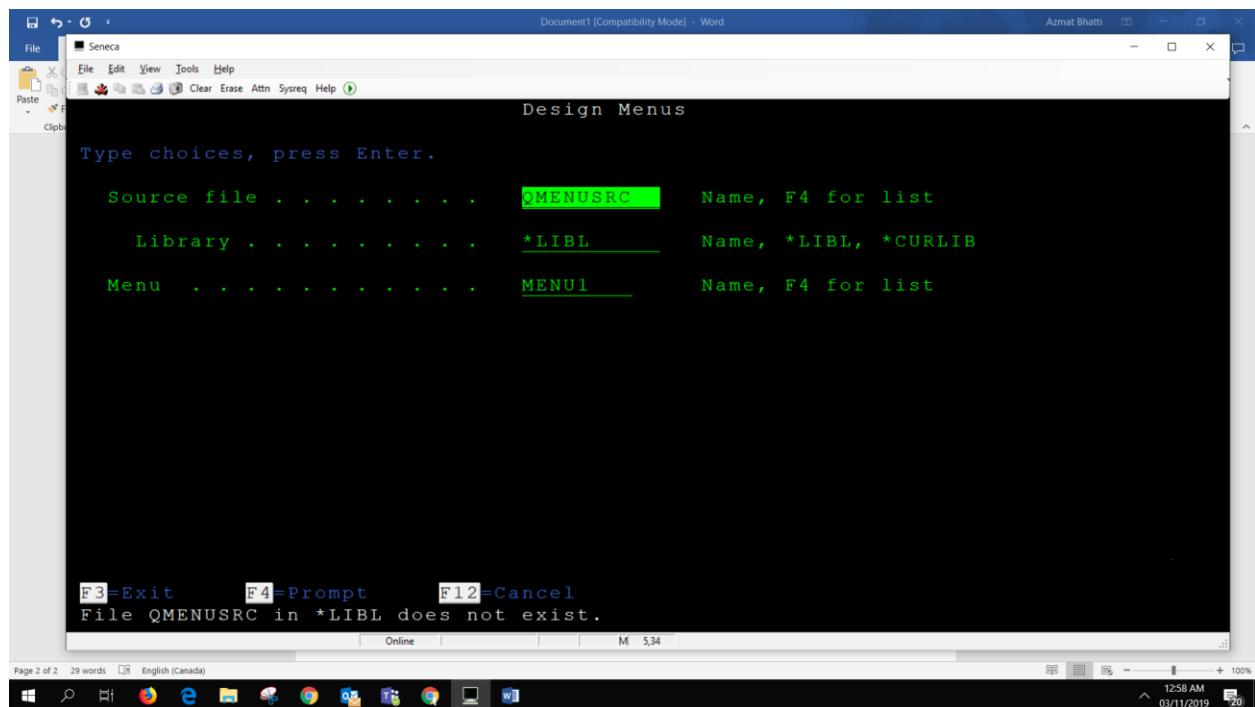
F3=Exit F4=Prompt F12=Cancel

Page 2 of 2 9 words English (Canada)

12:58 AM 03/11/2019 20

This screenshot shows a Microsoft Word document window titled "Design Menus". The menu bar includes File, Seneca, and a series of icons for Paste, Clear, Erase, Attn, Sysreq, and Help. The main area displays a command-line interface for menu creation. It prompts the user to "Type choices, press Enter." and lists three options: "Source file . . . . ." followed by a redacted path "qmenuusr", which is described as "Name, F4 for list"; "Library . . . . ." followed by a redacted path "\*LIBL", which is described as "Name, \*LIBL, \*CURLIB"; and "Menu . . . . ." followed by a redacted path "menu1", which is described as "Name, F4 for list". At the bottom of the window, there are keyboard shortcuts: F3=Exit, F4=Prompt, and F12=Cancel. A message at the bottom states "File QMENUSRC in \*LIBL does not exist." The status bar at the bottom shows "Page 2 of 2 9 words English (Canada)" and the date and time "12:58 AM 03/11/2019 20".

4 – If you get this error, it means that you need to create the source file.



Document1 [Compatibility Mode] - Word

Azmat Bhatti

File Seneca

File Edit View Tools Help

Paste Clear Erase Attn Sysreq Help

Type choices, press Enter.

Source file . . . . .	<u>QMENUSRC</u>	Name, F4 for list
Library . . . . .	<u>*LIBL</u>	Name, *LIBL, *CURLIB
Menu . . . . .	<u>MENU1</u>	Name, F4 for list

F3=Exit F4=Prompt F12=Cancel

File QMENUSRC in \*LIBL does not exist.

Page 2 of 2 29 words English (Canada)

12:58 AM 03/11/2019 20

This screenshot shows a Microsoft Word document window titled "Design Menus". The menu bar includes File, Seneca, and a series of icons for Paste, Clear, Erase, Attn, Sysreq, and Help. The main area displays a command-line interface for menu creation. It prompts the user to "Type choices, press Enter." and lists three options: "Source file . . . . ." followed by a redacted path "QMENUSRC", which is described as "Name, F4 for list"; "Library . . . . ." followed by a redacted path "\*LIBL", which is described as "Name, \*LIBL, \*CURLIB"; and "Menu . . . . ." followed by a redacted path "MENU1", which is described as "Name, F4 for list". A message at the bottom states "File QMENUSRC in \*LIBL does not exist.". The status bar at the bottom shows "Page 2 of 2 29 words English (Canada)" and the date and time "12:58 AM 03/11/2019 20".

## 5 – Crtsrcpf qmenusrc

```
Document1 [Compatibility Mode] - Word
Azmat Bhatti
File Seneca
File Edit View Tools Help
Clear Erase Attn Sysreq Help
Screen Design Aid (SDA)
Select one of the following:
1. Design screens
2. Design menus
3. Test display files

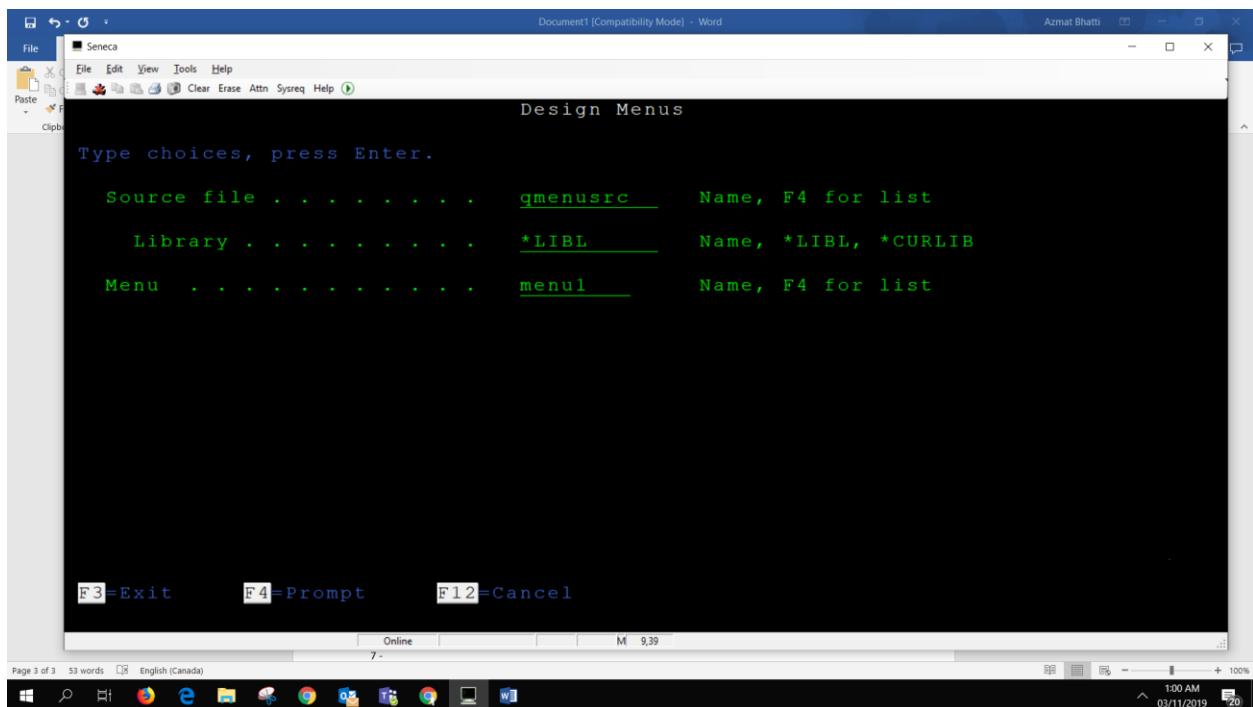
Selection or command
====> crtsrcpf qmenusrc
F1=Help F3=Exit F4=Prompt F9=Retrieve F12=Cancel
Page 2 of 2 47 words English (Canada)
12:59 AM 03/11/2019 20
```

## 6 – Source file created

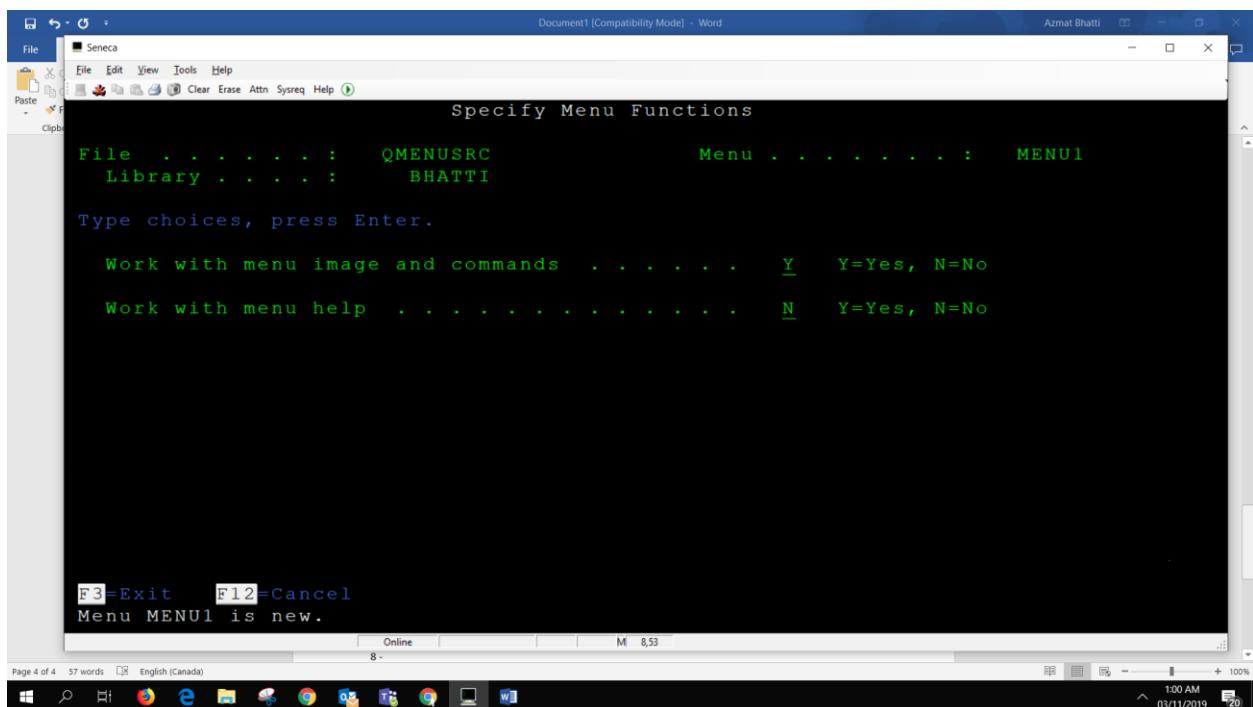
```
Document1 [Compatibility Mode] - Word
Azmat Bhatti
File Seneca
File Edit View Tools Help
Clear Erase Attn Sysreq Help
Screen Design Aid (SDA)
Select one of the following:
1. Design screens
2. Design menus
3. Test display files

Selection or command
====> 
F1=Help F3=Exit F4=Prompt F9=Retrieve F12=Cancel
File QMENUSRC created in library BHATTI.
Page 3 of 3 49 words English (Canada)
1:00 AM 03/11/2019 20
```

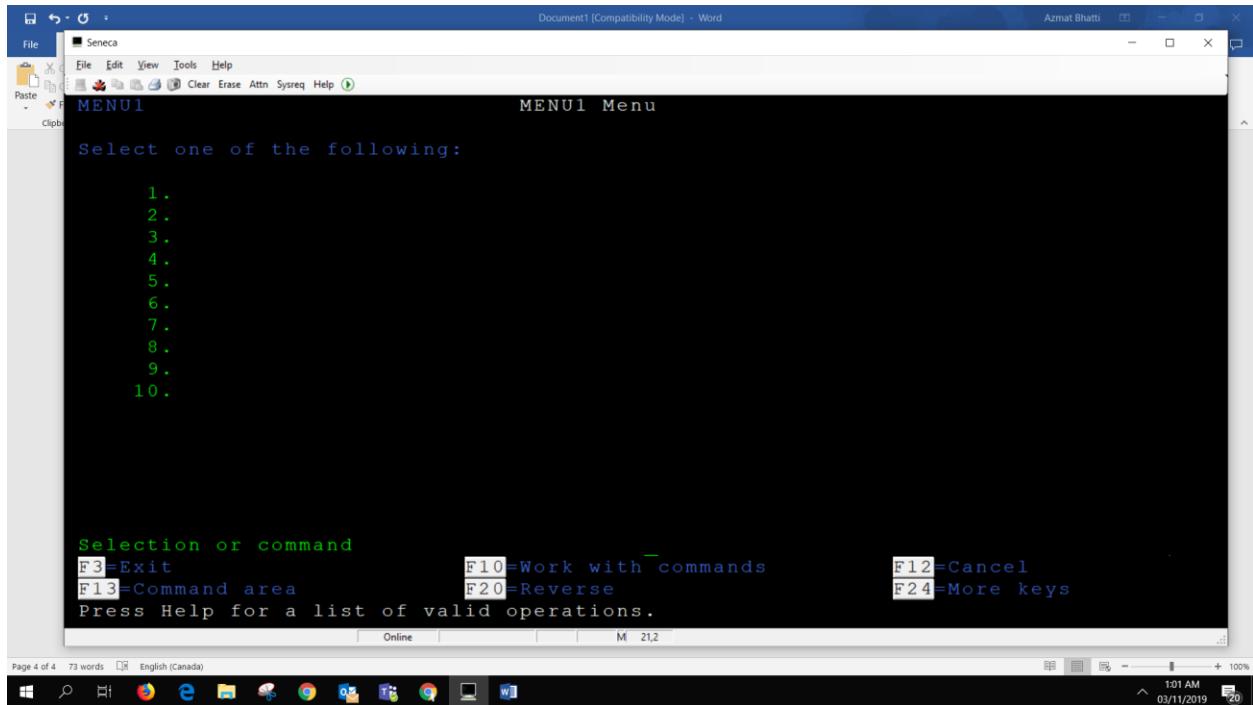
## 7 – Take option 2



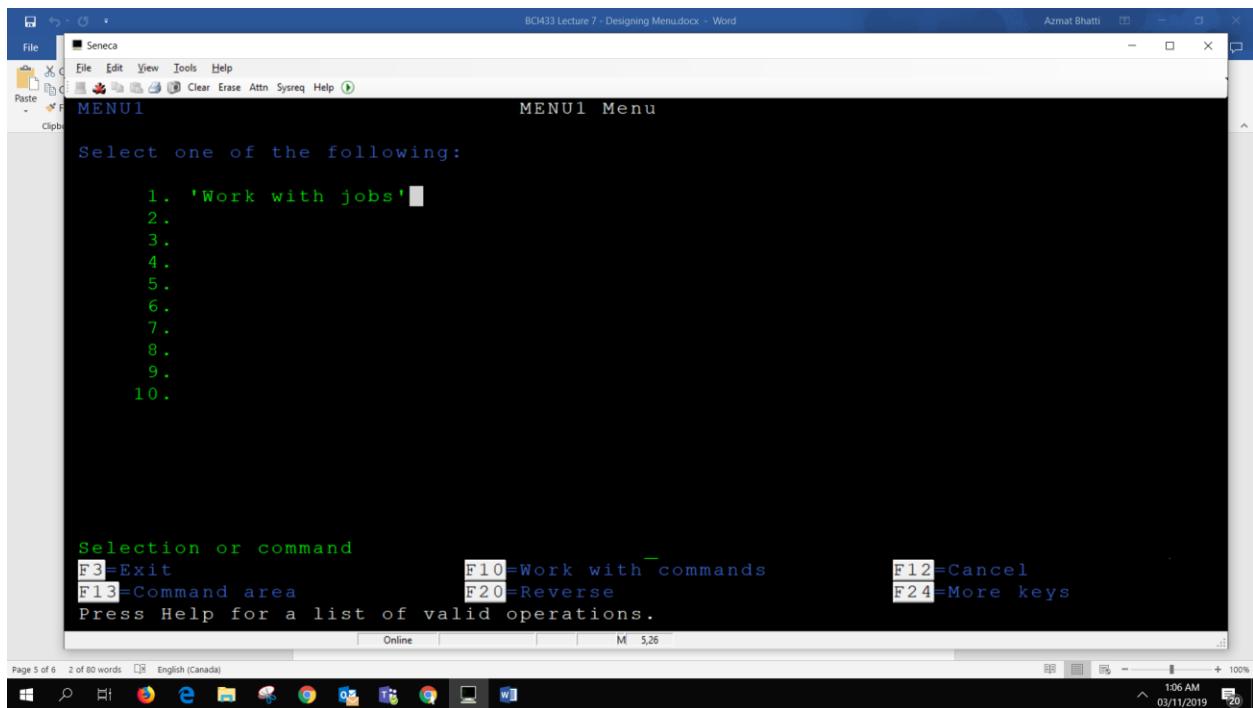
8 – You will see a screen like this. Leave Y as default for menu image and commands



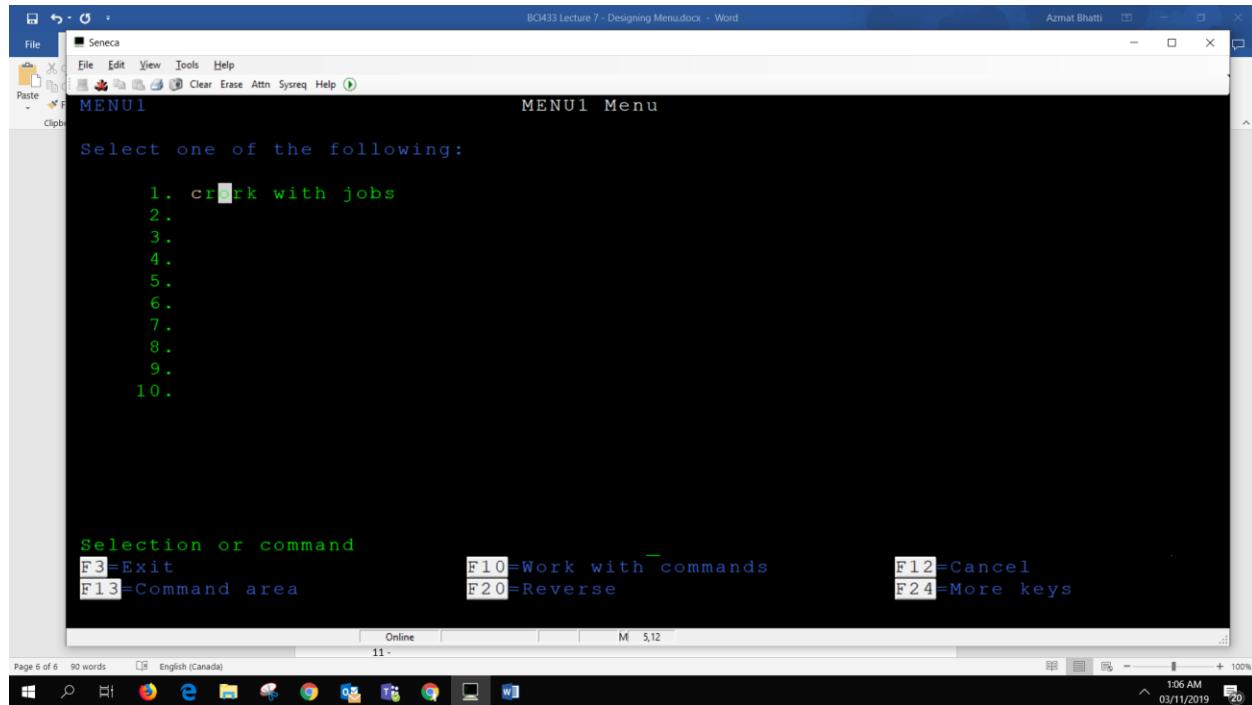
9 – Hit enter and this screen will come



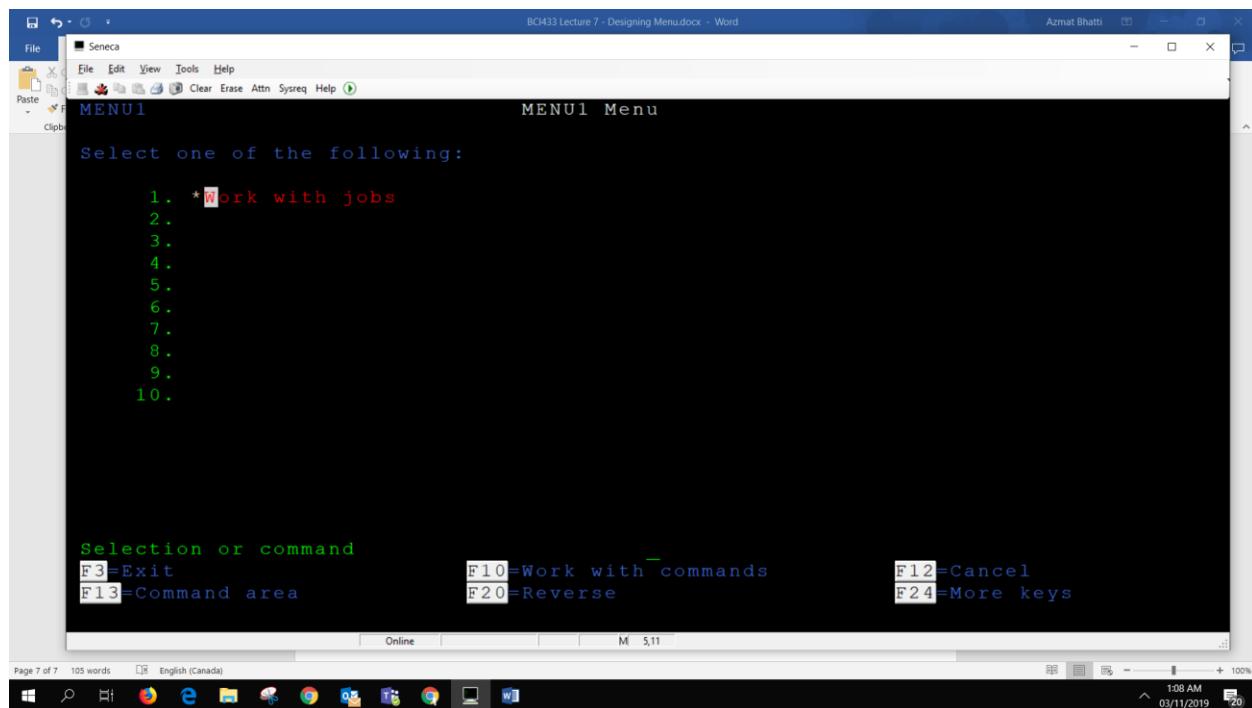
10 – Type in single quote 'Work with jobs'



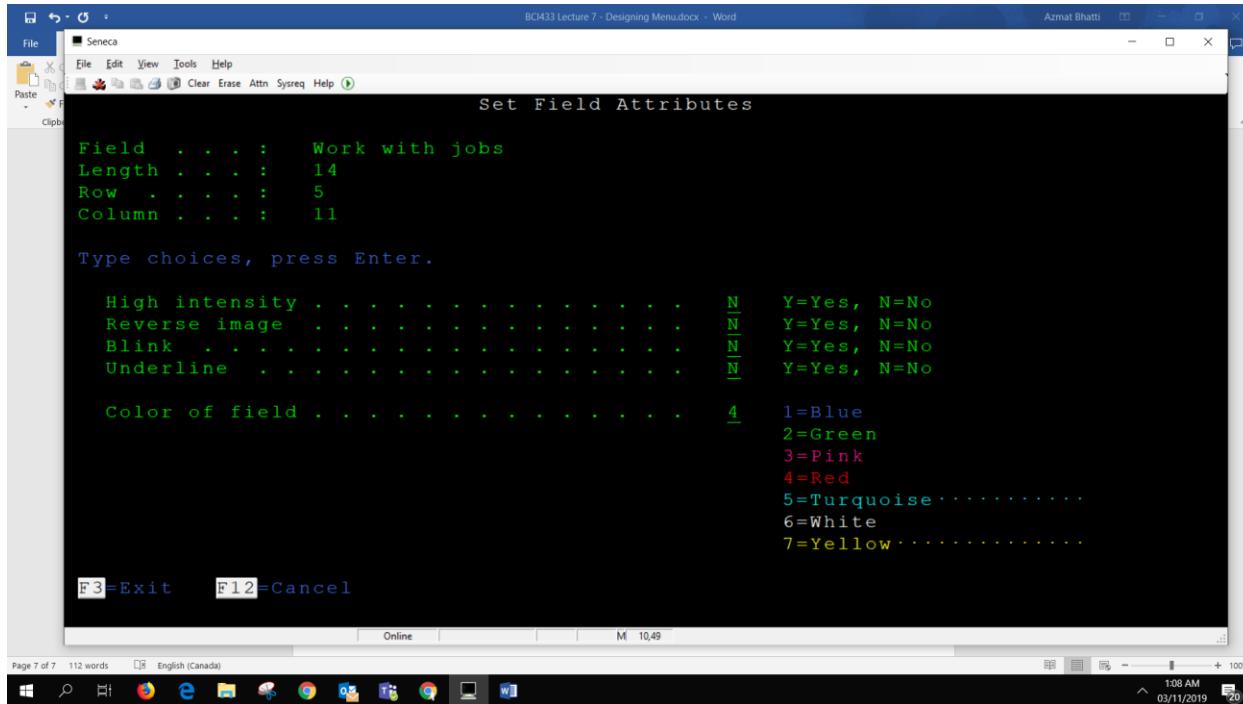
11 – Type cr for color red



12 – Type Asterix \* beside Work to see all other options



13 - Below options will be displayed. Change 4 to 5 to change the color then hit enter



```
BC433 Lecture 7 - Designing Menus.docx - Word
Azmat Bhatti
File Seneca
File Edit View Tools Help
Clear Erase Attn Sysreq Help
Clipboard
Set Field Attributes
Field . . . : Work with jobs
Length . . . : 14
Row . . . : 5
Column . . . : 11

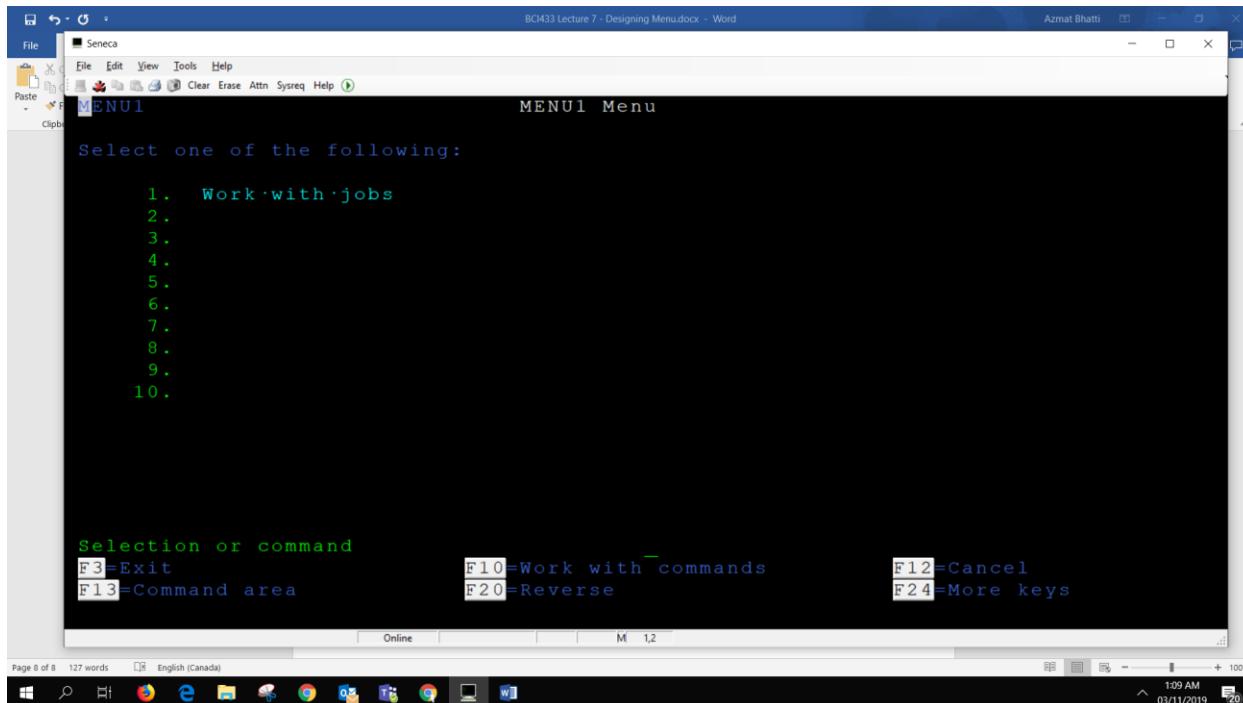
Type choices, press Enter.

High intensity . . . . . N Y=Yes, N=No
Reverse image . . . . . N Y=Yes, N=No
Blink . . . . . N Y=Yes, N=No
Underline . . . . . N Y=Yes, N=No

Color of field . . . . . 4 1=Blue
2=Green
3=Pink
4=Red
5=Turquoise.....
6=White
7=Yellow.....
F3=Exit F12=Cancel
Page 7 of 7 112 words English (Canada)
108 AM 03/11/2019 20

```

14 – Color is changed

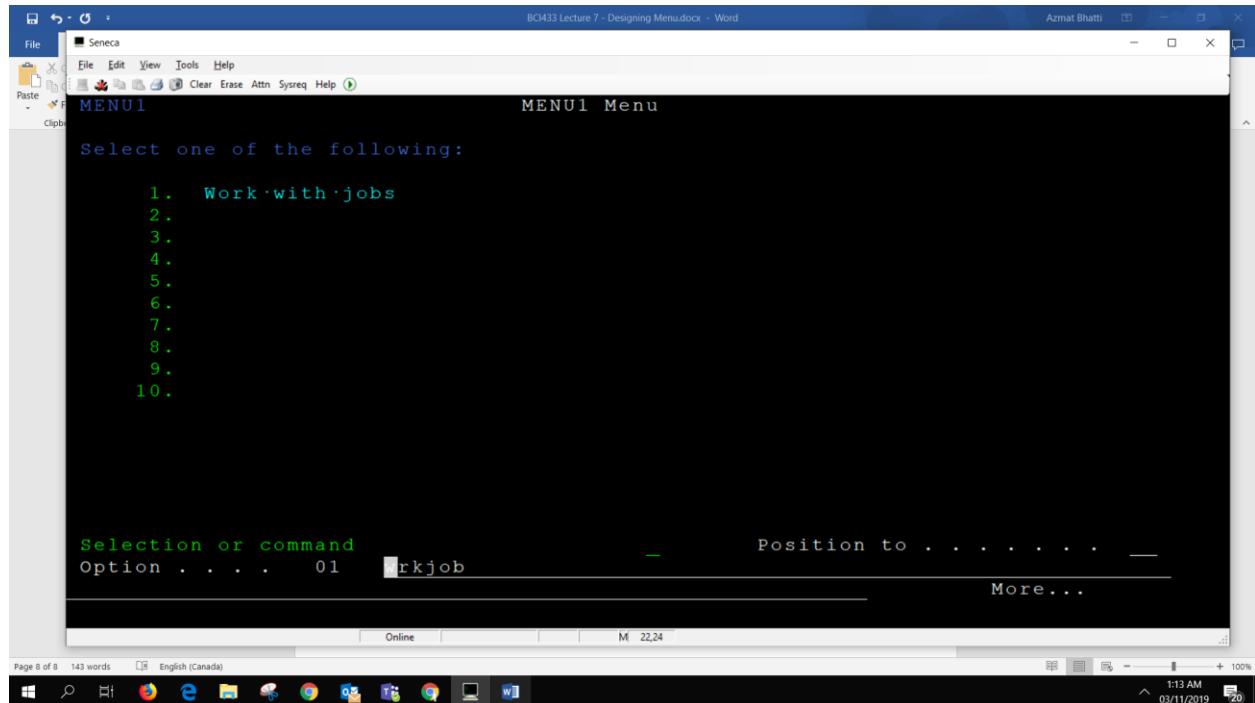


```
BC433 Lecture 7 - Designing Menus.docx - Word
Azmat Bhatti
File Seneca
File Edit View Tools Help
MENU1 MENU
Select one of the following:
1. Work with jobs
2.
3.
4.
5.
6.
7.
8.
9.
10.

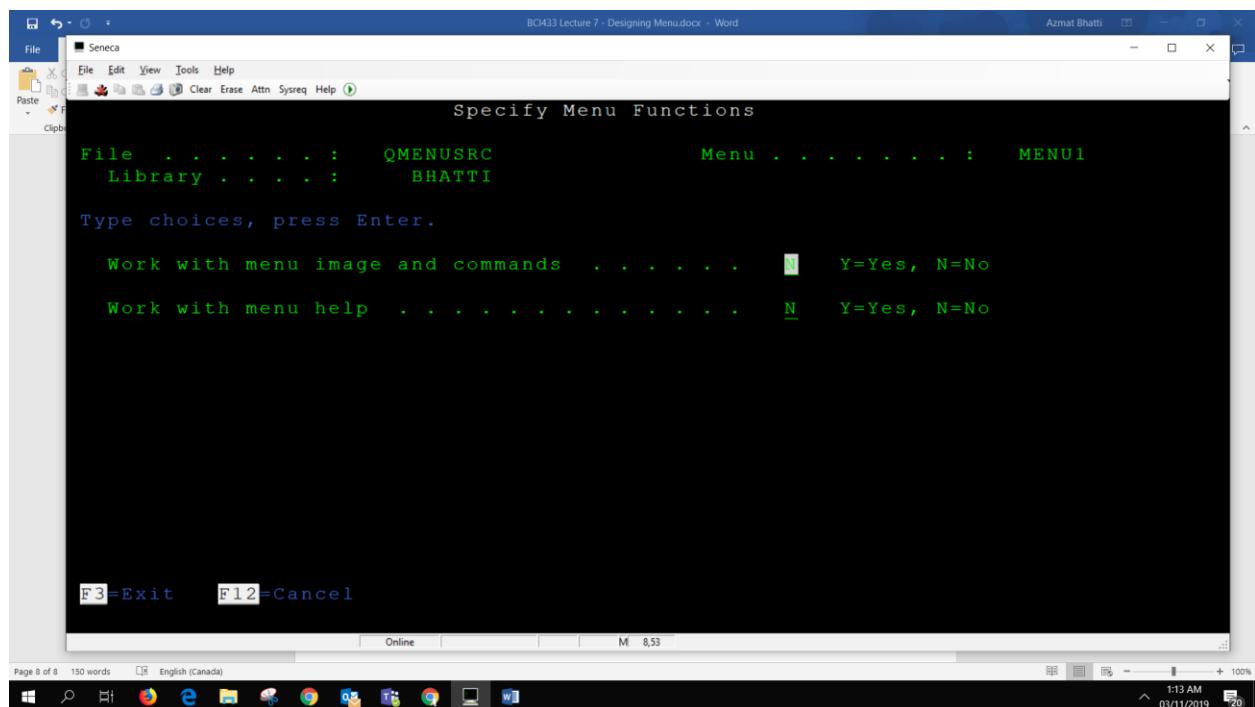
Selection or command
F3=Exit F10=Work with commands F12=Cancel
F13=Command area F20=Reverse F24=More keys
Page 8 of 8 127 words English (Canada)
109 AM 03/11/2019 20

```

15 – Now lets setup a command to run option 1. We will use the command wrkjob



16 – Lets press F3, save and exit



## 17 – Leave default options

18 – Message at the bottom will say saved and compiled in your library

BCI433 Lecture 7 - Designing Menus - Word Azmat Bhatti

File Seneca

File Edit View Tools Help

Clear Erase Attn Sysreq Help ⓘ

Type choices, press Enter.

Source file . . . . . QMENUSRC Name, F4 for list

Library . . . . . . . . . BHATTI Name, \*LIBL, \*CURLIB

Menu . . . . . . . . . MENU1 Name, F4 for list

F3=Exit F4=Prompt F12=Cancel

Menu MENU1 saved in BHATTI/QMENUSRC and compiled in BHATTI.

## 19 – Type go menu1

The screenshot shows a Microsoft Word document window with the title "BC433 Lecture 7 - Designing Menu.docx". The content of the document is a terminal window displaying a menu design. The window has a title bar "Screen Design Aid (SDA)". Inside, it says "Select one of the following:" followed by a list of three options: 1. Design screens, 2. Design menus, 3. Test display files. Below this, it says "Selection or command" and "====> goto menu1". At the bottom, it shows keyboard shortcuts: F1=Help, F3=Exit, F4=Prompt, F9=Retrieve, F12=Cancel. The status bar at the bottom of the Word window shows "Page 10 of 10", "171 words", "English (Canada)", and the date "03/11/2019".

## 20 – Your new menu is displayed

The screenshot shows a Microsoft Word document window with the title "BC433 Lecture 7 - Designing Menu.docx". The content of the document is a terminal window displaying a new menu. The window has a title bar "Screen Design Aid (SDA)" with "MENU1" highlighted. Inside, it says "Select one of the following:" followed by a list of ten options from 1. to 10.. Below this, it says "Selection or command" and "====> [ ]". At the bottom, it shows keyboard shortcuts: F3=Exit, F4=Prompt, F9=Retrieve, F12=Cancel, F13=Information Assistant, and F16=System main menu. The status bar at the bottom of the Word window shows "Page 11 of 11", "177 words", "English (Canada)", and the date "03/11/2019".

21 – Type 1 and hit enter

```
Work with Job
System: S10A04C2
Job: QPADEV0004      User: BHATTI      Number: 314213
Select one of the following:
1. Display job status attributes
2. Display job definition attributes
3. Display job run attributes, if active
4. Work with spooled files
10. Display job log, if active, on job queue, or pending
11. Display call stack, if active
12. Work with locks, if active
13. Display library list, if active
14. Display open files, if active
15. Display file overrides, if active
16. Display commitment control status, if active
More...
Selection or command
====> [ ]
```

F3=Exit F4=Prompt F9=Retrieve F12=Cancel

Page 11 of 11 183 words English (Canada)

22 – Lets add more options next

Work spool file – wrksplf

Work with active jobs – wrkactjob

Go menu2 – go menu2

Exit – signoff

Dspmsg – to Display a message

## Lecture 8

Job name comes from device name, unique user id

Batch job comes from submitting jobs -prompt the job, assign a command, give it a name or use the default

-Default job name is QDEFJOBD

### **PDM (Program Development Manager)**

-STRPDM: is the editor

>Can specify libraries to work with

>Once in the library you can specify objects to work with in the library (12 for selection)

>25 in object work is a development tool, but it's old school I guess

>16 is run, you cannot run a file

-A source is just a script and won't run, you need to compile it

>When you compile it you create a program, if it compiles it will execute

### **CRTCLPGM = create control language program**

-CRTSRCPF = create source physical file

-You can edit a file in the PDM editor to update it and change it

-9 (user defined options) will show shortcuts for different commands

-CALL programname will call the program to execute

>program needs to be compiled first

-Always compile into our library resources

### **CL Programming**

-I = inputs new line (can do multiple lines at once)

-Start with PGM (first line) It is required by our idiot teacher

>hit prompt so you can add a label or a comment (or parameters if it's a more complicated program)

-End with ENDPGM command

-DCL or DCLF comes second (for more complicated programs)

-Next is CL processing commands (such as DSPLIB)

-Next we can do logic

-When you leave editor it auto saves

-We create our program within a source physical file

-14 in PDM will compile the program

-Execute a compiled program with **CALL** and it will run the program

To debug a CL program

STRPDM -> option 3 and specify the CL file e.g. QCLSRC -> option 5 to view the file you want to debug OR option 2 to edit the file

- PARM = parameter
  - DCL = declare
    - VAR(&LIB1) TYPE(\*CHAR) LEN(10) means a variable called LIB1 that's char type with a length of 10
    - VAR(&FLAG1) TYPE(\*CHAR) LEN(1) VALUE('Y') means create a flag variable with a default value of Y
  - MONMSG = monitor message
  - IF COND(&FLAG1 \*EQ 'Y') THEN ()SNDPGMMSG + MSG(&LIB1 \*TCAT 'created')
- IF COND() THEN()
- CHGVAR (&LIB1) VALUE('')
- ENDPGM = end program

To compile a program use option 14 at Work With Members Using PDM stage

Work with Members Using PDM S7850740

File . . . . . QCLSRC  
Library . . . . . BHATTI Position to . . . . .

Type options, press Enter.

2>Edit 3=Copy 4=Delete 5=Display 6=Print 7=Rename  
8=Display description 9=Save 13=Change text 14=Compile 15=Create module...

Opt	Member	Type	Text
—	CLLEC8	CLP	Cat example
—	CLLIB0	CLP	Create a Library CLP
—	CLLIB1	CLP	Create a Library CLP
—	CLLIB2	CLP	Create a Library CLP by passing parameters
—	CLLIB3	CLP	Create a Library CLP by passing parameters loops
—	CLLIB4	CLP	Create a Library CLP by passing parameters loops
—	CLLIB5	CLP	Create a Library CLP by passing parameters loops
—	CLP1	CLP	

More...  
Parameters or command  
===>  
F3=Exit F4=Prompt F5=Refresh F6=Create  
F9=Retrieve F10=Command entry F23=More options F24=More keys  
Program CLLEC8 created in library BHATTI.

Call `cllec8(File name)` and it shows error message that the parameters are not found, that's when you go in and type in the parameters needed to run the program.

To run the program: CALL PGM(CLLEC8) PARM('july12lib')

Parameters or command  
==> **CALL PGM(CLLEC8) PARM('july12lib')**

---

F3=Exit F4=Prompt F5=Refresh F6=Create  
F9=Retrieve F10=Command entry F23=More options F24=More keys

To get to the debug tool:

STRISDB F4, remember to change the update production files to \*yes

Hit ENTER to enter the parameters

```
Start ISDB (STRISDB)

Type choices, press Enter.

Program . . . . . > CLLEC8      Name
  Library . . . . . > *LIBL      Name, *CURLIB, *LIBL
Update production files . . . > *YES      *YES, *NO
Invoke program . . . . . > *YES      *YES, *NO, *CMD
Parameters for call . . . . . 'july12lib'
_____
+ for more values _____
```

Hit ENTER

```
Debug      Goto      Program      Options      Help
BHATTI/CLLEC8:/0001      ISDB/400      More: >
000100      PGM      PARM(&LIB1)
000200      DCL      VAR(&LIB1) TYPE(*CHAR) LEN(10)
000300      DCL      VAR(&FLAG1) TYPE(*CHAR) LEN(1) VALUE('Y')
000400
000500      CRTLIB      LIB(&LIB1)
000600
000700      MONMSG      MSGID(CPF2111) EXEC(CHGVAR VAR(&FLAG1) +
                           VALUE('N'))
000800
000900      MONMSG      MSGID(CPF0001) EXEC(SNDPGMMMSG MSG(&LIB1 +
                           *BCAT 'library value is invalid.'))
001000
001100
001200      IF      COND(&FLAG1 *EQ 'Y') THEN(SNDPGMMMSG +
                           MSG(&lib1 *BCAT 'created'))
001300      IF      COND(&FLAG1 *EQ 'N') THEN(SNDPGMMMSG +
                           MSG(&LIB1 *BCAT 'already exists'))
001400
001500      CHGVAR      VAR(&LIB1) VALUE('          ')
001600
001700
001800      ENDPGM
ISDB ===>
F3=Exit      F5=Step      F6=Break      F11=Display variable
F12=Cancel    F17=Run       F23=Change variable   F24=More keys
(C) COPYRIGHT IBM CORP. 1993, 2007.
```

Click on the desirable place and do F11 to display variable, e.g. select (&LIB1)

```

Debug      Goto      Program      Options      Help
BHATTI/CLLEC8:/0001          ISDB/400      More:    >
000100      PGM       PARM(&LIB1)
000200      DCL       VAR(&LIB1) TYPE(*CHAR) LEN(10)
000300      DCL       VAR(&FLAG1) TYPE(*CHAR) LEN(1) VALUE('Y')
000400
000500      CRTLIB    LIB(&LIB1)
000600
000700      MONMSG   MSGID(CPF2111) EXEC(CHGVAR VAR(&FLAG1) +
000800                      VALUE('N'))
000900      MONMSG   MSGID(CPF0001) EXEC(SNDPGMMMSG MSG(&LIB1 +
001000                      *BCAT 'library value is invalid.'))
001100
001200      IF        COND(&FLAG1 *EQ 'Y') THEN(SNDPGMMMSG +
001300                      MSG(&lib1 *BCAT 'created'))
001400      IF        COND(&FLAG1 *EQ 'N') THEN(SNDPGMMMSG +
001500                      MSG(&LIB1 *BCAT 'already exists'))
001600      CHGVAR   VAR(&LIB1) VALUE('           ')
001700
001800      ENDPGM
ISDB ===>
F3=Exit   F5=Step   F6=Break   F11=Display variable
F12=Cancel F17=Run    F23=Change variable  F24=More keys
(C) COPYRIGHT IBM CORP. 1993, 2007.

```

```

Display Program Variables

Program . . . . . . . . . . . . . . . : CLLEC8
Recursion level . . . . . . . . . . . . . : 1
Start position . . . . . . . . . . . . . : 1
Format . . . . . . . . . . . . . . . : *CHAR
Length . . . . . . . . . . . . . . . : *DCL

Variable . . . . . . . . . . . . . . . : &LIB1
Type . . . . . . . . . . . . . . . : CHARACTER
Length . . . . . . . . . . . . . . . : 10
*....+....1....+....2....+....3....+....4....+....5
'july12lib'

```

To set up watch parameter: watch \*LIB1 ENTER watch &FLAG1 ENTER

By doing so it will show you what the variables are throughout the program

To unwatch the parameter, the command is unwatch

```

Debug      Goto      Program      Options      Help
BHATTI/CLLEC8:/0001          ISDB/400      More:    +    >
&LIB1='july12lib '
&FLAG1='Y'
000100      PGM       PARM(&LIB1)
000200      DCL       VAR(&LIB1) TYPE(*CHAR) LEN(10)
000300      DCL       VAR(&FLAG1) TYPE(*CHAR) LEN(1) VALUE('Y')
000400
000500      CRTLIB    LIB(&LIB1)

```

To change the variable, place the cursor at the variable position and do F23

The screenshot shows the ISDB/400 debugger interface. The menu bar includes 'Debug', 'Goto', 'Program', 'Options', and 'Help'. The 'Program' menu is selected, showing 'ISDB/400'. The main window displays a series of assembly-like statements. A cursor is positioned over the variable '&LIB1'. A tooltip 'Change Variable' appears above the cursor. Below the statements, there is a legend for function keys: F3=Exit, F5=Step, F6=Break, F11=Display variable, F12=Cancel, F17=Run, F23=Change variable, and F24=More keys. A message at the bottom states 'Cursor location is incorrect for this function.'

```
Debug      Goto      Program      Options      Help
BHATTI/CLLEC8:500          ISDB/400
&LIB1='july12lib '
&F ..... .
00 :             Change Variable
00 :
00 : Typ choices, press Enter.
00 :
00 : Variable . . . . . :
00 : [&LIB1]
00 : Value . . . . . : _____ &FLAG1)
00 :
00 : F12=Cancel
00 : .
001100
001200           IF      COND(&FLAG1 *EQ 'Y') THEN(SNDPGMMMSG +
001300                         MSG(&lib1 *BCAT 'created'))
001400           IF      COND(&FLAG1 *EQ 'N') THEN(SNDPGMMMSG +
001500                         MSG(&LIB1 *BCAT 'already exists'))
001600           CHGVAR   VAR(&LIB1) VALUE(' ')
ISDB ===>
F3=Exit      F5=Step      F6=Break      F11=Display variable
F12=Cancel    F17=Run       F23=Change variable    F24=More keys
Cursor location is incorrect for this function.
```

To run the debug -> F17 or do step by step -> F5

If you do step by step, hit F5 all the way till the program ends. And you can use dspjoblog and F10 to check the messages from the debugger/program

The screenshot shows the ISDB/400 debugger interface. The menu bar includes 'Debug', 'Goto', 'Program', 'Options', and 'Help'. The 'Program' menu is selected, showing 'ISDB/400'. The main window displays a list of messages. At the top, it says 'Display All Messages'. It shows a header with 'Job . . . : QPADEV001Q', 'User . . . : BHATTI', 'System: 87850740', and 'Number . . . : 570398'. The messages list includes: 'Unable to retrieve query options file.', 'CALL PGM(BHATTI/CLLEC8) PARM( 'july12lib')', '/\* ISDB stopped at statement /0001 in program CLLEC8 \*/', 'Unable to retrieve query options file.', '/\* ISDB stopped at statement 500 in program CLLEC8 \*/', 'Library JULY12LIB created.', '/\* ISDB stopped at statement 1200 in program CLLEC8 \*/', 'july12lib created', '/\* ISDB stopped at statement 1400 in program CLLEC8 \*/', '/\* ISDB stopped at statement 1600 in program CLLEC8 \*/', '/\* ISDB stopped at statement 1800 in program CLLEC8 \*/', 'ISDB has ended. Program no longer in debug mode.', 'dspmsg'. At the bottom, it says 'Press Enter to continue.' and shows a legend for function keys: F3=Exit, F5=Refresh, F12=Cancel, F17=Top, F18=Bottom, and 'More...'. A message at the bottom states 'Press Enter to continue.'

```
Display All Messages
System: 87850740
Number . . . : 570398
Job . . . : QPADEV001Q      User . . . : BHATTI
Unable to retrieve query options file.
CALL PGM(BHATTI/CLLEC8) PARM( 'july12lib')
/* ISDB stopped at statement /0001 in program CLLEC8 */
Unable to retrieve query options file.
/* ISDB stopped at statement 500 in program CLLEC8 */
Library JULY12LIB created.
/* ISDB stopped at statement 1200 in program CLLEC8 */
july12lib created
/* ISDB stopped at statement 1400 in program CLLEC8 */
/* ISDB stopped at statement 1600 in program CLLEC8 */
/* ISDB stopped at statement 1800 in program CLLEC8 */
ISDB has ended. Program no longer in debug mode.
4 > dspmsg
More...
Press Enter to continue.

F3=Exit      F5=Refresh      F12=Cancel      F17=Top      F18=Bottom
```

On the top of the navigation bar, select one of the menu option and hit Enter to display a "drop down menu"

```
Debug          Goto          Program          Options          Help
BHATTI/LEC8:/0001           ISDB/400        More:      >
000100      PGM   : █ 1. Display object description :
000200      : 2. Display program :
000300      DCL   : 3. Display program reference :
000400      : 4. Work with job :
000500      CHKOBJ:.....
000600      MONMSG: MSGID(CPF9801) EXEC(CHGVAR VAR(&FLAG) +
000700                  VALUE('N'))
000800
```