Inside This Issue:

Interskill Learning Planned New Curriculum and Updates for 2013  2
Highlights of Interskill Learning Releases from 2012  3
Are YOU Prepared For Disaster Recovery?  4
Vendor Briefs  6
Tech-head Knowledge Test  9
Learning Spotlight – Data Center Storage  9
Takuzu Puzzle  10

technical: Learning Assembler: Where Do You Start?  11
Welcome to the Interskill Mainframe Quarterly

Interskill Mainframe Training Newsletter is an e-Zine published by Interskill Learning, which provides world-class elearning Mainframe training programs for the Information Communications and Technology industry.

As a subscriber to Interskill Mainframe Training Newsletter you will receive an edition several times per year which will include z/OS related articles for technical experts and management, and information on upcoming releases of Interskill’s Mainframe curriculum.

Interskill Learning Planned New Curriculum and Updates for 2013

Storage Fundamentals for Data Centers
Managing the Storage Network
Parallel Sysplex
Unix System Services
CA 1 Tape Management
CA Workload Automation CA 7 Edition
CA Workload Automation Restart Option for z/OS Schedulers (formally CA11)
CA ACF2
CA SYSVIEW Performance Management
CA OPS/MVS Event Management and Automation
CA Easytrieve
CA Endevor Software Change Manager
Disaster Recovery
Performance Monitoring
Coaching and Mentoring
Linux on System z
DASD Volume Initialization
z/OS Version 2.1
IBM Power Series – iSeries
• Security Implementation
• Journal Management
• Storage Management
• Logical Partitioning and Virtualization
• Backup and Recovery
• Problem Determination and Prevention in Production Support
Highlights of Interskill Learning Releases from 2012

Interskill Learning releases for 2012 included the following:

- Cloud Computing for Data Centers
- Introduction to Mainframe Security
- The z/OS Management Facility
- The complete z/OS Series updated to V1.13 including:
  - z/OS
  - z/Enterprise
  - JCL
  - TSO/ISPF
  - JES2
  - Console Simulations
  - SDSF
  - z/OS Systems Programming Fundamentals
  - Assessments
- A new z/OS Utilities series with new courses on VSAM, General Data Set Utilities, and Data Utilities
- New courses in the Power series for IBM i Operators and IBM i System Administrators including:
  - Monitoring and Managing IBM i Workloads
  - Introduction to IBM i for System Operators
  - IBM i System Administration Fundamentals
- A new series of courses on Project Management
The first thing you will most likely think of when someone mentions a disaster are occurrences such as earthquakes, floods, storms and hurricanes, and your organization will probably have tested scenarios associated with these events. But stop and think how the following could also affect you and your organization:

- Major IT hardware failure
- Extended power outage
- Epidemic/pandemic
- Cyber attack
- Employee health and safety incident
- Environmental accident (i.e. hazardous material spill or explosion)
- Supply chain disruption
- Terrorist event
- Sabotage

What your organization expects from you

During any disaster, the focus for the majority of organizations will be for data to be recovered and made accessible within a specific time frame. Your role in this process is likely to be a well worn path with automation and well tested manual procedures identifying the process that needs to be taken. Business continuity and disaster recovery though is not a one-off event. Your organization will also expect the following from you:

- Cross training with other individuals/teams (because not everyone is going to be available during a disaster situation).
- Involvement with testing the plan. This may involve active or passive tests using

Disaster Recovery / Business Continuity

Before looking at your role in a disaster situation we must first take a more high-level view of what constitutes a disaster. In fact, disaster recovery is usually associated with the recovery of IT services (data and network) following a major disruptive event. It is likely that this information will form part of your organization’s overall business continuity plan that identifies all critical aspects of the business and how they should be recovered/maintained in a disaster situation.

By Greg Hamlyn

Disaster Recovery planning has been around forever but with the increased amount of data being produced, compliance requirements and customer expectations, your business could easily cease to exist if the planning doesn’t convert to recovery. A recent Compuware survey put the short term cost of IT failure at US $10.8 million, but of course this will vary between industry and the criteria used to identify lost costs.

So, with so much at stake, do you know your role in disaster recovery and are you prepared for it?
a number of scenarios to ensure that everyone is aware of what to do.

- Review and provide feedback on testing or actual disaster recovery events. This could include technical details outlining a better approach to data recovery, or as general as not having enough people trained in what was regarded as a simple recovery process.

Your organization will also be aware that in many disaster situations you may not be available, either because you can not physically access the work environment (weather) or remotely (power or telecommunication outage). They also understand that personal priorities such as attending to family and home matters will often take precedence over work.

Are you prepared?

Most people believe that they will never be involved in a disaster recovery situation even though they may undertake planning and testing of disaster recovery plans in the workplace. If you think you are well prepared, see how you go answering the questions below (It may prove interesting to present your answers to your boss to see if you agree!)

- Are you adequately skilled across at least two other Data Center job roles?
- What action should you take if one of the disasters mentioned previously occurs and:
  - you are at home?
  - you are at work, and the most senior onsite person?
- What would you do if you were the senior person on-site during a disaster and the majority of staff wanted to leave to attend to family/home issues?
- Are you aware of all the internal and external data compliance requirements in relation to data security and access?
- What would you do if during a disaster the person with authority directed you to perform tasks that were in direct contrast to what was in the business continuity plan?
- How would you handle the situation if you were responsible for communicating the status and activity of your organization during a disaster, but the general telecommunication lines were down?

The questions above only represent a subset of the types of decisions that you may be called upon to make during a disaster and will give you a good idea on whether you are personally prepared for such a situation.

In our next newsletter we will continue our focus with the disaster recovery theme and rather than address the obvious disaster readiness requirements, we will look at some real life issues that you need to think about. Until then, stay safe.

Greg Hamlyn, a senior technical course designer and developer with Interskill, has over 25 years experience working in the mainframe and z/OS data center environments, having performed in numerous operational roles ranging from computer operator to national mainframe technical training manager for a large Government agency. He has presented at AFCOM and has written a number of articles relating to training methods and trends and everything that is z/OS.

You can contact him at g.hamlyn@interskilllearning.com
Vendor Briefs

As a result of our newsletter going biannual there has been quite a lot of vendor activity since the beginning of the year. Unless you have been living under a rock, you would not have escaped the hype surrounding cloud, analytics, mobile and the Devops movement. So, it is not a surprise that many vendor software products are focusing on these areas, making things easier, and faster (in some cases much faster). On top of this, a new zEnterprise has been born (the announcement coincidentally fell on the same day as the future King of England’s birth) and the release of z/OS 2.1 is just around the corner....technology never stands still long enough for us to learn everything about it!

IBM

zEnterprise
As I am writing this, IBM has just released their latest business class mainframe server offering, the BC12. This is the successor to the z114 and as you would expect there are the usual performance improvements....but not too many surprises for those that have been working alongside the EC12.

<table>
<thead>
<tr>
<th></th>
<th>z114</th>
<th>BC12</th>
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<tbody>
<tr>
<td>Maximum processing capability</td>
<td>3100 MIPS</td>
<td>4958 MIPS</td>
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<tr>
<td>Processors</td>
<td>3.8 Ghz</td>
<td>4.2GHz</td>
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<tr>
<td>Maximum cores</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Maximum number of configurable cores</td>
<td>10</td>
<td>13</td>
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<tr>
<td>Maximum number of capacity settings</td>
<td>130</td>
<td>156</td>
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<tr>
<td>Maximum system memory</td>
<td>248GB (+8 GB for the Hardware System Area)</td>
<td>496GB (+16 GB for the Hardware System Area)</td>
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IBM’s Flash Express and the System z Advanced Workload Analysis Reporter (zAware) that were integrated into the EC12 have also found their way into the BC12. The Flash Express feature is an I/O card that as you might have guessed provides flash memory, and is used primarily for paging activity and SVC dumps. zAware is a system monitoring tool with a difference. It is designed to identify what it considers to be normal system behavior, which it does by analyzing system messages over a specified period. So, it is a self learning tool that once up to speed can quickly recognize any system bottlenecks, failures or just unusual messages or their frequency, and report on them immediately.

There are too many other enhancements to mention here, so check out IBM’s website and the zEnterprise BC12 redbook for more information on these and the following:
• zEDC (new data compression card)
• 10GB Ethernet RoCE (memory to memory communication between CPCs)
• IBM Mobile Systems Remote (mobile/tablet access to the HMC using an app, which
allows remote monitoring and management of BladeCenters and Rack Mounted systems)

IBM is pricing its hardware and software offerings associated with the BC12 competitively especially in relation to running Linux (there is a Linux only based model of the BC12 available) and running cloud and analytics applications. A great opportunity for medium sized businesses looking to upgrade or consolidate its x86 sprawl, or new businesses requiring reliable, powerful and secure services to offer new customers. At a $75,000 starting price I might start looking at one for the home office!

IBM SmartCloud - DB2 Analytics using BLU Acceleration
IBM’s Smartcloud offerings are growing almost daily, providing products and services for organizations looking to take advantage of private, public and hybrid cloud environments. One of IBM’s latest releases in this area is around the hot topic of analytics - IBM Smartcloud DB2 Analytics using BLU Acceleration. BLU’s combination of memory optimization, data storage techniques and hardware exploitation provides speeds up to 25 times faster when dealing with the analyzing and reporting of analytical data.

IBM MobileFirst – Rational Test Workbench
Earlier this year IBM launched MobileFirst, aimed at providing organizations with the capability to move into the mobile world by providing solutions related to: mobile application development, management of mobile devices linked to the business, mobile security, and mobile usage analytics. Let’s face it if your organization doesn’t use mobile applications to allow some customer communication or interaction, then you are going to be left behind.

IBM’s latest release in this area is the Rational Test Workbench, which provides application developers with automated processes for testing highly complex and integrated mobile applications. This is an area that can be very time consuming – creating test scenarios using hardware, software and cloud based variables, emulating workloads accurately whilst needing to support current standards and protocols.

z/VM 6.3
Tweaks to this system allow it to exploit the latest enhancements to the zEnterprise EC12 and BC12 systems. Real memory support up to 1TB for those running very large virtual machines is now provided while there are a number of performance/efficiency improvements such as z/VM HiperDispatch, which manages z/VM LPAR placement and processor usage. Combined, these items now provide customers with the ability to consolidate up to 520 virtual servers in a single footprint.

IBM Enterprise COBOL for z/OS 5.1
Long live COBOL! With an estimated 200 billion lines of COBOL code still in existence, IBM has recently freshened its capabilities with the release of IBM Enterprise COBOL for z/OS 5.1. A new compiler option (ARCH) allows you to identify the hardware that the code will run on, and the compiler will optimize the code for that environment. For example, the ARCH(10) option produces code that utilizes instructions available on the zEnterprise EC12. XML processing enhancements and support for Java 7 is also provided in this release and shows IBM’s continued push towards modernizing COBOL capabilities.

Upcoming releases
The much anticipated z/OS 2.1 will be made available at the end of September, 2013.
CA Technologies

CA Chorus 3.0
CA Technologies’ integrated mainframe management product, CA Chorus, has recently been expanded with the release of new network and system capabilities. These changes provide the ability to display a wide range of mainframe-related performance information in a dashboard format, which can be customized and shared between colleagues.

Compuware

Abend-Aid
For many mainframe application developers, Compuware’s Abend-Aid has often been there to assist with identifying and analyzing faults and abends, whether it is in PL/I, COBOL or Assembler. In July, Compuware announced enhancements to Abend-Aid making it easier to be used by staff unfamiliar with legacy systems, shortening the time it takes to analyze and resolve problems.

APM for Mainframe
Compuware’s APM for Mainframe (released late 2012) is an end-to-end transaction performance monitoring solution capable of tracking transaction activity across browser, distributed and mainframe platforms. Compuware have recently enhanced this product to extend its support for CICS to include CICS Transaction Gateway (CTG) and CICS Web Services (SOAP).

Global Executive Cost of IT Failure Survey
A recently presented Compuware sponsored survey highlighted the long-term and short-term costs to business when IT fails. It also discusses the difficulty in measuring this information as it will be different depending on the criteria used (which is slightly different for all of these surveys I have read).

The magic figure for short-term costs..... around US $10.8 million. Check out the link provided here for details about this survey.


Rocket Software

One of the hot trends at the moment is identifying how to turn all your valuable data into actionable intelligence. One issue is likely to be that your mainframe data may be stored in a number of different formats (flat files, hierarchical databases, relational databases).

Well, Rocket Software is here to help with their recent release of Rocket z/SQL. This product provides organizations with access to non-relational mainframe data through standard SQL calls by performing all the in-place mainframe data transformation requirements in the background.

Brocade

Network and storage specialists, Brocade has recently announced the release of their latest Storage Area Networking (SAN) solution – Fabric Vision. This hardware and software technology allows data transfer rates of 16 Gbps. The solution provides administrators with the tools to more quickly monitor and identify potential data flow issues, displaying this information through a customizable health and performance dashboard.

Brocade has also released a new high density SAN switch – the 6250. This device
Incredibly, 90% of all data in the world has been created in the last two years, with expectations that the total amount of digital data will reach 40 zettabytes by 2020 (this is forty billion terabytes). The majority of this data will be stored in a data center environment and will need to adhere to compliance and security requirements. It is little surprise then that the importance of data center storage has seen resurgence, and today is considered a “hot topic” for conversation around corporate boardrooms.

With advances in storage hardware and software technology moving just as quickly, it is important for data center technical staff to have an understanding of these components and how they can be leveraged to provide organizations with their needs.

The module that we have provided for you here is Overview of Data Center Storage which describes the storage needs facing data centers and provides an overview of the types of hardware and software that can help provide the solution.

We hope you enjoy it.
Takuzu Puzzle

Looking for something different now that you have mastered Soduku? Well, how about a version of this popular puzzle for mainframers where instead of using 1 to 9, the puzzle consists of binary 0s and 1s....introducing Takuzu.

Here are the rules you need to follow:
1. Each box should contain a 0 or a 1.
2. You are not allowed to have more than two 0s or 1s next to each other
3. Each row and each column should contain an equal number of 0s and 1s.
4. Each row and column should be unique.
Each Takuzu puzzle has only one solution.

Good luck.

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technical: Learning Assembler: Where Do You Start?

By David Stephens, Lead Systems Programmer at Longpela Expertise

So you want to learn to program in assembler. Congratulations, and welcome to the select few. Most programmers are terrified of assembler language, and stick to more comfortable high-level languages like Java, C and COBOL. But in the mainframe world, there are times when a problem needs assembler. And by learning to program in assembler, you’re going to gain other benefits: the basics of dump analysis, a better understanding of how programs work, and even hints on improving program efficiency.

The problem is that for the beginner, learning assembler is hard. Hard, but not impossible. Twenty-odd years ago I did it with less resources than are available today. And I’m not alone. So if I were starting over again, how would I learn assembler today?

Step 1: Get the Tools

First of all, you need somewhere where you can create, assemble and run your programs. The best place is a test z/OS system. However if this isn’t an option, all is not lost. You can use the excellent and free z390 Assembler Emulator from www.z390.org.

The rest of your tools are books:

- IBM Principles of Operation – I call it POPs. This is a scary looking book describing the internal workings of the System z processors. But don’t be afraid. It lists all the assembler instructions, and what they do. Once you get used to the format, this is the best assembler instruction reference. You can find it on the front page of the z/OS Infocenter.
- Bill Quall’s Mainframe Assembler Programming. Originally written by Bill in 1998, and now available as a free download. This is a great introduction to assembler programming. Bill refers to the PC/370 emulator in this book – this is now the z390 emulator mentioned above.
- HLASM Programmers Guide – you will use this together with POPs above. POPs details instructions to the mainframe processor. This book explains about assembler language, and how to use the High Level Assembler. Also available from the HLASM section in the z/OS Infocenter.
- MVS Programming: Assembler Services Guide and the two MVS Programming: Assembler Service References. These are three books that describe the z/OS system services you can call from assembler. Again, found in the MVS section in the z/OS Infocenter.
- DFSMS Macro Instructions for Data Sets – this describes the assembler macros essential for access VSAM and non-VSAM datasets. Found in the DFSMS section in the z/OS Infocenter.

Step 2a: If You Can, Do a Course

Here’s where the problems start. Ideally, a great first step in learning assembler would be to do a course. In the past a few vendors offered a 5 day course to introduce assembler programming, and get you started. Today, most of these have dried up, though The Trainers Friend and Verhoef still advertise classroom-based assembler courses.

If you’re lucky enough to get to a Share
conference, then attend their Assembler Bootcamp: a series of five sessions introducing assembler run every conference.

All the above options assume you have a travel budget. For most of us, this isn’t possible. Interskill offer a great range of online assembler courses you can do anywhere, from introductory level up to advanced concepts such as cross-memory and 64 bit programming. If you have access, these are a great place to start. zNextGen members are eligible for free courses, and Interskill will offer an assembler course in September. Marist College’s IDCP also hold assembler training classes that can be studied remotely.

Another alternative is to find someone who knows assembler, and is willing to be your mentor. Longpela Expertise offers a similar service through our Systems Programming Mentoring training.

Step 2b: Read

If Step 2a doesn’t work for you, it’s not all over. Here’s how you start.

1. Work through the five Enterprise Server Intro to Programming – Assembler PowerPoint presentations from IBM. This provides an easy-to-digest introduction to assembler.
2. Read the first five chapters of the High Level Assembler Language Reference. This builds on what you’ve already seen in the PowerPoint presentations in step 1. I know, there’s a lot of reading here. But before you can program in assembler, you need to know some of the basics about memory, registers, hexadecimal and other concepts. Once you have these, you’re ready to get into it:
3. Assemble your first program. You may think that your first program will be a ‘Hello World’ program called from TSO, but this isn’t as simple as you’d think. And few assembler programs run in TSO. So a better platform to start with is batch. Modify the following JCL to suit your site, and run it:

```
//JOB1 JOB (ACCT),'ASSEMBLE',CLASS=A,MSGCLASS=X
///* Assemble
//C      EXEC PGM=ASMA90
//SYSLIB  DD  DSN=SYS1.MACLIB,DISP=SHR
//SYSUT1  DD  DSN=&SYSUT1,SPACE=(4096,(12,12),,,ROUND),
//       UNIT=SYSDA,DCB=BUFNO=1
//SYSPRINT DD  SYSOUT=*  
//SYSLIN  DD  DSN=&OBJ,SPACE=(3040,(40,4),,,ROUND),
//       UNIT=SYSDA,DISP=(MOD,PASS),
//       DCB=(BLKSIZE=3040,LRECL=80,RECFM=FB,BUFNO=1)
//SYSIN   DD   DATA,DLM=QQ
*===================================== 
* ASSEMBLER PROGRAM
*===================================== 
TST1  AMODE 31
```
TST1 RMODE ANY
TST1 CSECT
   BAKR  R14,0        SAVE CALLERS ENVIRONMENT
   LR    R12,R15      LOAD OUR ADDRESS IN R12
   USING TST1,R12    USE R12 AS BASE REG
   LA    R15,53       LOAD 53 AS RETCODE
   PR    RETURN TO CALLER
END    END OF PROGRAM

QQ
   //*
   //* Link-Edit
   //L    EXEC PGM=HEWL,PARM='MAP,LET,LIST,NCAL',COND=(8,LT,C)
   //SYSLIN DD DSN=&&OBJ,DISP=(OLD,DELETE)
   //    DD DDNAME=SYSIN
   //SYSUT1 DD DSN=&&SYSUT1,SPACE=(1024,(120,120),,,ROUND),
   //    UNIT=SYS ALLDA,DCB=BUFNO=1
   //SYSPRINT DD SYSOUT=*  
   //SYSLMOD DD DSN=MY LOAD.DATASET(TST1),DISP=SHR
   ///* Execute
   //R    EXEC PGM=TST1,COND=(8,LT,L)
   //STEPLIB DD DISP=SHR,DSN=MY LOAD.DATASET

Don’t forget to change the load library (MY LOAD.DATASET) to your own load library. This job assembles, binds and executes a simple assembler program that returns the number 53. It’s a great first step.

4. By now you’ve assembled and run your first program. You’re away. Go to Bill Quall’s book and start reading. Tweak the program in step 3 as you work through.

Step 3: Code

The only way to really learn assembler is to write assembler. So write assembler programs. You could write programs as you work through Bill Quall’s book. Or you could write the following programs in order, building on the simple program in Step 2b.

1. Return the number \((10+15-45)*2\) to introduce mathematical options.
2. Return a number entered as a parameter (EXEC PGM=TST1,PARM='22' in the jobs in Step 2a) to introduce parameter handling.
3. Return the number of letters of a string input to introduce strings and loops.
4. Output a parameter entered to OPERLOG/SYSLOG to introduce z/OS service routines, and in particular, WTO.
5. Write a string into a sequential dataset to introduce datasets and allocation.
6. Write some information into a VSAM dataset to introduce VSAM.
7. Abend the program using the ABEND macro to introduce errors and error handling.
8. Insert the following code into your program:
XR R1,R1
BR R1

Try to explain what this does, and why. This will introduce you to addresses, and memory management.

9. Output the current day and time to introduce data handling, and some more system routines.

10. Output the name of the job executing – see our Control Blocks for Beginners article for some sample code. This introduces control blocks, mapping DSECTs, and internal z/OS structure.

If you successfully managed to create these 10 programs, you’re well on your way.

**Step 4: Research**

Once you get confidence, start reading and researching how better to program in assembler. Here are some good places to start:

- **IBMs Enterprise Server Intro to Programming – Assembler** has more advanced assembler programing PowerPoint presentations.
- **Eight Ways to Improve Your Assembler Programs** – David Stephens, Longpela Expertise, 2013.
- **Understanding Re-entrant Programming** – David Stephens, Longpela Expertise, 2010
- **Using USINGs** – David Cole, Colesoft, 2005
- **Coding Assembler for Performance - David Bond, Tachyon Software, 2007**
- **Why Assembler is a 21st Century Language** – Kristine Harper, NEON

Also look for other assembler programs, and see how they work. IBM provides many in sys1.samplib. One of my favourite sources for assembler is the brilliant CBT website.

**Step 5: Keep Programming**

Many people do a quick assembler course, and let it lapse. Fast forward five years and they’ve forgotten almost everything. So keep on using assembler. Program, debug, and explore.

Twenty-odd years ago I taught myself assembler in a similar way to what I’ve outlined here. And I found it hard work. But it was definitely worth it, and today I love assembler. Anyone working with me will recognise when I’ve seen a chance to use assembler by the large grin on my face. I hope you enjoy it as much as I do. Good luck in your assembler adventure.

Source:

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