

Execution Order and Job Flow

Task 1.2 Deliverable -- Determine How to Run the Programs

This document reconstructs the intended execution order and data flow for the Cook County property tax rate calculation programs. The order is inferred from file dependencies (one program's output DD name matching another program's input DD name), program header comments, and functional grouping.

Important caveat: The original mainframe JCL (Job Control Language) that defined the actual job streams is not included in the repository. This reconstruction is based on analysis of COBOL source code, file assignments, and program purpose descriptions. The actual production job flow may have included additional steps, conditional execution, or different ordering.

Overview of Major Processing Phases

The tax extension system processes property tax data through the following major phases:

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Phase 1: IMS Database Extracts
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Phase 2: Assessment Master Processing
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  v
Phase 3: Homeowner/Exemption File Creation
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  v
Phase 4: Senior Freeze Exemption Processing
  |
  v
Phase 5: Frozen Valuation Computation
  |
  v
Phase 6: Tax Rate Making (CLRTM Pipeline)
  |
  v
Phase 7: Reporting and Verification
```

Phase 1: IMS Database Extracts

These programs extract data from IMS hierarchical databases into sequential files for downstream batch processing. They must run in an IMS/DB environment (or be replaced by equivalent flat-file extracts for GnuCOBOL testing).

1.1 Extract Exempt Data

Step	Program	Purpose	Key Output
1.1a	ASHMA921	Extract exempt data from IMS DB	UT-S-OUTFILE (exempt data)
1.1b	ASHMA922	Extract exempt data from IMS DB (variant)	UT-S-OUTFILE (exempt data)
1.1c	ASHMA923	Extract assessment data from IMS DB	UT-S-OUTFILE (assessment data)

1.2 COE Report Workfile

Step	Program	Purpose	Key Output
1.2a	ASCOE500	Create COE report workfile from IMS	UT-S-ASCOEWRK (COE workfile)

1.3 Update PIF Database (IMS)

Step	Program	Purpose	Key Input	Key Output
1.3a	ASHMA840	Update PIF DB from assessment data	UT-S-ASSFMSDT, UT-S-CARD	UT-S-RPT (report)
1.3b	ASHMA845	Update PIF DB (variant)	UT-S-ASSFMSDT, UT-S-CARD	UT-S-RPT, UT-S-ERRRPT
1.3c	ASHMA828	Update PIF DB detail segments	UT-S-CNTRLFLE, UT-S-UPDATEF, DA-MSGTBL	UT-S-UPDATER, UT-S-UPDATEER

1.4 Delete IMS Records

Step	Program	Purpose
1.4a	ASREA007	Delete IMS DB records (cleanup/reset)

Phase 2: Assessment Master Processing

These batch programs process the assessment master file -- the central data structure that carries property assessment records. Programs in this phase read and update the master file sequentially.

2.1 Master File Preparation

Step	Program	Purpose	Key Input	Key Output
2.1a	ASREA005	Delete print alignment records	UT-S-INFILE	UT-S-OUTFILE
2.1b	ASREA010	Match tax code master with summary tape	UT-S-MASTER, DA-I-TAXCODE	UT-S-PRNTFILE
2.1c	ASREA018	Process assessment master	UT-S-MASTIN	UT-S-MASTOUT, UT-S-PRINTFL
2.1d	ASREA105	Process assessment master	UT-S-MASTIN	UT-S-MASTOUT

Step	Program	Purpose	Key Input	Key Output
2.1e	ASREA110	Create railroad/real estate summaries	UT-S-MASTER	UT-S-RRSUM, UT-S-RESUM
2.1f	ASREA151	Process assessment master	UT-S-MASTERIN	UT-S-MASTROUT, UT-S-PRINTFLE
2.1g	ASREA352	Compare/update taxcode on BA master	UT-S-MSTRIN, UT-S-BAMSTR	UT-S-MSTROUT

2.2 Master File Value Updates

Step	Program	Purpose	Key Input	Key Output
2.2a	ASHMA831	Populate current total M-VALUE(9)	UT-S-MSTRIN, UT-S-MSTRIN2, UT-S-COEFILE	UT-S-MSTROUT
2.2b	ASREA178	Convert type 5 detail to type 3	UT-S-MIN	UT-S-MOUT, UT-S-PRINT

2.3 Service Request Processing

Step	Program	Purpose	Key Input	Key Output
2.3a	ASSRQ560	Chicago circulator / mixed class processing	UT-S-MASTIN	UT-S-MASTOUT, UT-S-PRINT
2.3b	ASSRQ561	Service request processing	UT-S-MASTIN	UT-S-MASTOUT, UT-S-PRINT

2.4 COE Processing

Step	Program	Purpose	Key Input	Key Output
2.4a	ASCOE515	Process COE workfile	UT-S-PARMCRD, UT-S-ASCOEWRK, UT-S-CARDSIN	UT-S-PRINT, UT-S-ASCOEPRW
2.4b	ASHMA855	Base year value calc for COE records	UT-S-ASCOEPRW, DA-EQUALFCT	UT-S-OUTFILE, UT-S-PRINT1, UT-S-PRINT2

Phase 3: Homeowner / Exemption File Creation

These programs create and maintain the homeowner exemption master file, which tracks which properties qualify for homeowner, senior, disability, and other exemptions.

3.1 Homestead Master Creation

Step	Program	Purpose	Key Input	Key Output
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Step	Program	Purpose	Key Input	Key Output
3.1a	ASHMA440	Create homestead sequential master from VSAM	UT-S-HMSTMSTR, DA-VSAMHMST	UT-S-PRINTER
3.1b	ASHMA550	Update master with homestead/veteran indicators	UT-S-MASTIN, UT-S-VETMAST, UT-S-HOMESTD	UT-S-MASTOUT, UT-S-PRNTFILE
3.1c	ASHMA660	Create homestead co-op master	DA-COOP, DA-MSTR	UT-S-LIST

3.2 New Year Homeowner File Creation

Step	Program	Purpose	Key Input	Key Output
3.2a	ASREA852	Create new year homeowner file	UT-S-MASTER, UT-S-HOMEIN	UT-S-HOMEOUT, UT-S-PRNTOUT
3.2b	ASREA853	Create new year homeowner file (variant)	UT-S-MASTER, UT-S-HOMEIN	UT-S-HOMEOUT, UT-S-PRNTOUT
3.2c	ASREA859	Create senior freeze file	UT-S-MASTER, UT-S-HOMEIN	UT-S-HOMEOUT, UT-S-PRNTOUT

Both ASREA852, ASREA853, and ASREA859 dynamically CALL subprogram **ASREA003** (the valuation calculator) for property valuation computations.

3.3 Homeowner File Maintenance

Step	Program	Purpose	Key Input	Key Output
3.3a	ASREA841	Apply renewal records to homeowner master	UT-S-HOMEMSTR, UT-S-RENEWAL	UT-S-HOMEOUT, UT-S-PRINTOUT, UT-S-ERRPRINT
3.3b	ASREA847	Update homeowner from VSAM property master	UT-S-HOMEIN, DA-PROPMAS	UT-S-HOMEOUT
3.3c	ASREA856	Process homeowner master	UT-S-MAST	UT-S-TEMPOUT
3.3d	ASREA863	Edit homestead equalized valuation maintenance	UT-S-INFILE, DA-VOLFILE	UT-S-HOMEXEMP, UT-S-DETFEIL, UT-S-ERRFILE
3.3e	ASREA864	Process homestead with landmarks	UT-S-HOMEXEMP, UT-S-HOMESTD, UT-S-EQFACT, DA-LANDMARK	UT-S-OUTHOM, UT-S-PRINT, UT-S-ERROR

Step	Program	Purpose	Key Input	Key Output
3.3f	ASREA866	Process homeowner with homestead	UT-S-MAST, UT-S-HOMESTD	UT-S-HOMEOUT
3.3g	ASREA868	Process homeowner master (report)	UT-S-MAST	UT-S-PRINT
3.3h	ASREA869	Process homeowner master	UT-S-MAST	UT-S-TEMPOUT
3.3i	ASREA872	Process homeowner master (report)	UT-S-HOMOWN	UT-S-PRINTFLE
3.3j	ASREA874	Disability exemption processing	UT-S-INFILE, DA-VOLFILE	UT-S-DISEXMPT, UT-S-PRINTFLE
3.3k	ASREA880	Process equalized valuations	UT-S-EQVAL, UT-S-MAST	UT-S-OUT, UT-S-PRINT
3.3l	ASREA881	Process homeowner with master	UT-S-MASTER, UT-S-HOWNERI	UT-S-HOWNERO
3.3m	ASREA909	Process assessment with frozen values	UT-S-ASSRINFL, UT-S-MASTERFL, DA-FRZVAL	<i>(updates VSAM)</i>

3.4 Homeowner/Assessment Master Match

Step	Program	Purpose	Key Input	Key Output
3.4a	ASHMA839	Create output from homeowner/assessment match	UT-S-HOMASTER, UT-S-CURASMST, DA-LDMKFILE, DA-NPHEPRO	UT-S-PRIASMST, UT-S-HOMSTOUT, UT-S-NPHEFILE

Phase 4: Senior Freeze Exemption Processing

The senior freeze pipeline processes the Senior Citizens Assessment Freeze Homestead Exemption, which freezes assessed values for qualifying senior citizens.

4.1 Senior Freeze Data Load and Update

Step	Program	Purpose	Key Input	Key Output
4.1a	ASHMA825	Update freeze file with homestead data	UT-S-SENIOR, UT-S-HOMEIN, UT-S-SRFREEZE	UT-S-PRNTOUT
4.1b	ASHMA827	Load sequential senior freeze to PIF DB	UT-S-SENFZRZ, UT-S-PARM	UT-S-RPT
4.1c	ASHMA830	Create senior freeze proration file	UT-S-CNTRLFLE	UT-S-PRORATF, UT-S-PRORATR

Step	Program	Purpose	Key Input	Key Output
4.1d	ASHMA832	Update PIF DB from proration file	UT-S-CNTLFILE, UT-S-PRORATE	UT-S-RPTFILE

4.2 Senior Freeze Assessment Update

Step	Program	Purpose	Key Input	Key Output
4.2a	ASHMA836	Update assessment master with senior freeze	UT-S-CNTRLFLE, UT-S-MSTRIN, UT-S-HOMESTD, UT-S-HOMEXMPT, UT-S-COOP	UT-S-MSTROUT, UT-S-RPT

4.3 Senior Freeze Base Value Computation

Step	Program	Purpose	Key Input	Key Output
4.3a	ASHMA850	Compute senior freeze base value (IMS)	UT-S-PARAM, UT-S-CURRASS, UT-S-PRIORASS, UT-S-EXPIRASS, DA-EQUALFCT	UT-S-FINDER, UT-S-PRINT1..4
4.3b	ASHMA857	Senior freeze base value (sequential output)	UT-S-PARAM, UT-S-CURRASS, UT-S-PRIORASS, UT-S-EXPIRASS, DA-EQUALFCT	UT-S-SNRFREZ, UT-S-PRINT1..4
4.3c	ASHMA859	COE/Senior freeze vs DB comparison	UT-S-PARAM, UT-S-INFILE	UT-S-PRINT1, UT-S-PRINT2

Phase 5: Frozen Valuation Computation

This phase computes frozen valuations for property tax limitation (PTELL / "tax caps") for quad townships and creates division-level valuation breakdowns.

5.1 Frozen Valuation File Creation

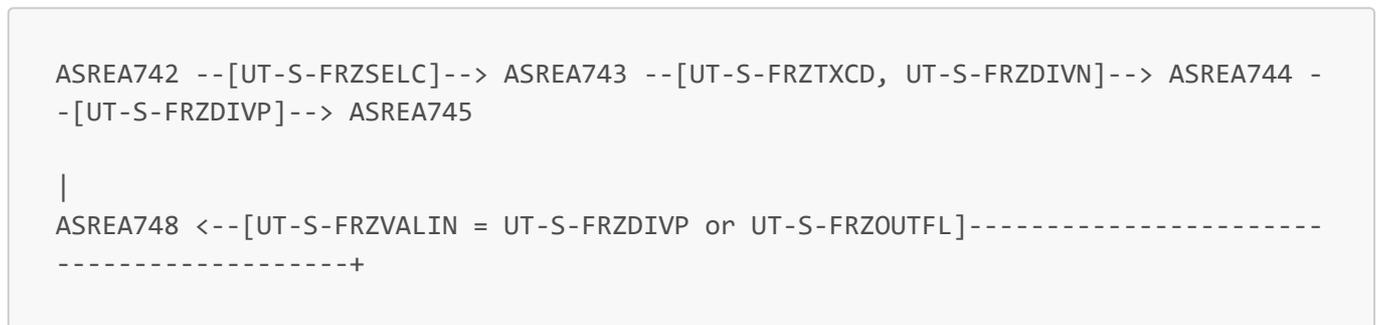
Step	Program	Purpose	Key Input	Key Output
5.1a	ASREA740	Create frozen valuation for quad townships	UT-S-MASTNEW, UT-S-MASTOLD, DA-FRZVALFL	UT-S-OUTPUTF, UT-S-PRINTFLE, UT-S-PRINTERR, UT-S-PRINTDTL
5.1b	ASREA741	Create frozen valuation (variant)	UT-S-MASTNEW, UT-S-MASTOLD, DA-FRZVALFL	UT-S-OUTPUTF, UT-S-PRINTFLE, UT-S-PRINTERR, UT-S-PRINTDTL

5.2 Frozen Valuation Breakdown

Step	Program	Purpose	Key Input	Key Output
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Step	Program	Purpose	Key Input	Key Output
5.2a	ASREA742	Select frozen valuation records	UT-S-MASTNEW	UT-S-FRZSELC, UT-S-PRINTFLE
5.2b	ASREA743	Create division and tax code breakdown	UT-S-FRZSELC	UT-S-FRZDIVN, UT-S-FRZTXCD
5.2c	ASREA744	Create division percentage file	UT-S-FRZTXCD, UT-S-FRZDIVN	UT-S-FRZDIVP, UT-S-PRINTFLE
5.2d	ASREA745	Update VSAM frozen valuation file	UT-S-FRZINFL, DA-FRZVALFL	UT-S-FRZOUTFL
5.2e	ASREA748	Create frozen agency file from tax code master	UT-S-FRZVALIN, DA-TXCDMSTR	UT-S-FRZAGCY

Data flow within Phase 5.2:



Phase 6: Tax Rate Making (CLRTM Pipeline)

This is the core tax rate calculation pipeline. It applies taxing agency levies against equalized assessed valuations to compute tax rates, accounting for TIF districts, disconnected/annexed areas, and property tax extension limitations.

6.1 TIF Processing

Step	Program	Purpose	Key Input	Key Output
6.1a	CLRTM356	Remove TIF parcels from assessment master	UT-S-TIFDETL, UT-S-ASSESMST	UT-S-ASSESOUT, UT-S-REPORT
6.1b	CLRTM757	Create updated TIF difference file	UT-S-EQUAL, UT-S-CLTIFP, UT-S-CLTIFC	UT-S-CLTIFDIF, UT-S-PRINT, UT-S-PRTERR
6.1c	CLRTM759	Update frozen agency with TIF differences	DA-TAXCODE, DA-FROZFILE, UT-S-TIFDIFLE	UT-S-PRINTFLE

6.2 Division and Agency Processing

Step	Program	Purpose	Key Input	Key Output
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Step	Program	Purpose	Key Input	Key Output
6.2a	CLRTM751	Apply division number to valuation file	UT-S-EQUALVAL, UT-S-DIVISION	UT-S-OUTPUT
6.2b	CLRTM752	Apply taxing agencies to assessment master	UT-S-MASTERIN, DA-TXCDFILE	UT-S-AGCYMSTR, UT-S-PRINTFLE
6.2c	CLRTM753	Compute disconnected/annexed agency valuation	UT-S-PRIORAGY, UT-S-CURRAGY	UT-S-DISANXAG, UT-S-PRINTFLE
6.2d	CLRTM755	Update frozen agency with dis/annex values	UT-S-DISCANNX, UT-S-OAGENCY, DA-FRZAGIN	UT-S-NAGENCY, UT-S-PRNTFILE
6.2e	CLRTM756	Update VSAM agency equalized valuation	UT-S-NEWPROP, DA-AGYEQUAL	UT-S-PRINTFLE

6.3 Reporting

Step	Program	Purpose	Key Input	Key Output
6.3a	CLRTM749	New property report by agency number	UT-S-FRZAGIN, AGCYEFTS, UT-S-EQUALFIL	UT-S-NEWPROP, UT-S-PRINTFLE
6.3b	CLRTM750	New property report by town within agency	UT-S-FRZAGIN, AGCYEFTS	UT-S-PRINTFLE, UT-S-APPENDED

6.4 Equalization Factors

Step	Program	Purpose	Key Input	Key Output
6.4a	CLREB020	Edit and list equalization factors	UT-S-CARDS	UT-S-PRINT, UT-S-FACTOR

Phase 7: EasyTrieve Reports

The following EasyTrieve scripts produce reports but are not compiled as COBOL programs. They are listed for completeness:

Script	Description
ASHMA360.ezt	Homestead/assessment reporting
ASHMA361.ezt	Homestead/assessment reporting
ASHMA441.ezt	Homestead master reporting
ASHMA856.ezt	Senior freeze reporting
ASREA004.ezt	Assessment reporting
ASREA006.ezt	Assessment reporting

Script	Description
ASREA016.ezt	Assessment reporting
ASREA037.ezt	Assessment reporting
ASREA828.ezt	Assessment reporting
ASREA829.ezt	Assessment reporting
ASREA876.ezt	Homeowner exemption reporting
ASREA896.ezt	Assessment reporting
ASREA897.ezt	Assessment reporting
ASREA898.ezt	Assessment reporting
ASREA899.ezt	Assessment reporting
CLRTM748.ezt	Tax rate making reporting
CLSRQ074.ezt	Service request reporting

Subprogram Call Relationships

```

ASREA178 -----+
ASREA852 -----+-----> CALL ASREA003 (dynamic subprogram, compiled as .dylib)
ASREA853 -----+      [Valuation calculator: computes property values for type 1-5
records]
ASREA859 -----+
    
```

ASREA003 is the only dynamic subprogram. It receives a record via **PROCEDURE DIVISION USING D1-REC** and returns via **GOBACK**. It performs pure computation (no file I/O).

Key Data Flow Chains

Chain A: Assessment Master Pipeline

```

IMS Extracts (ASHMA921/922/923)
|
v (sequential extract files)
ASREA005 -> ASREA010 -> ASREA018/105 -> ASREA151 -> ASREA352
|                                     |
v                                     v
Assessment Master File (UT-S-MASTIN/MASTOUT chain)
|
v
ASHMA831 (populate M-VALUE) -> ASHMA550 (homestead/vet indicators)
|
    
```

```

v
ASSRQ560/561 (service requests) -> CLRTM356 (TIF removal)
    
```

Chain B: Homeowner Exemption Pipeline

```

ASHMA440 (VSAM -> sequential homestead)
|
v
ASREA852/853 (create new year homeowner file, calls ASREA003)
|
v
ASREA841 (apply renewals) -> ASREA847 (update from VSAM)
|
v
ASREA863 (edit valuations) -> ASREA864 (landmarks) -> ASREA866/868/869
|
v
ASHMA839 (match homeowner + assessment master)
    
```

Chain C: Senior Freeze Pipeline

```

ASREA859 (create senior freeze file, calls ASREA003)
|
v
ASHMA825 (update freeze with homestead)
|
v
ASHMA827 (load to PIF DB) -> ASHMA828 (update PIF details)
|
v
ASHMA830 (create proration) -> ASHMA832 (update PIF from proration)
|
v
ASHMA836 (update assessment master with freeze)
|
v
ASHMA850/857 (compute base value) -> ASHMA859 (comparison)
    
```

Chain D: Frozen Valuation / Tax Rate Making Pipeline

```

ASREA740/741 (create frozen valuation)
|
v
ASREA742 -> ASREA743 -> ASREA744 -> ASREA745 (division breakdown)
|                                     |
v                                     v
    
```

```
ASREA748 (frozen agency)          CLRTM751 (apply divisions)
  |                                |
  v                                v
CLRTM752 (apply agencies) -> CLRTM753 (dis/annex) -> CLRTM755 (update frozen
agency)
  |
  v
CLRTM756 (update VSAM agency EV) -> CLRTM749/750 (new property reports)
  |
  v
CLRTM757 (TIF differences) -> CLRTM759 (update frozen with TIF)
```

Notes on Execution

1. **No JCL available:** The original JCL job streams are not in the repository. The execution order above is reconstructed from source code analysis.
2. **IMS dependency:** 16 programs require IMS/DB access. For GnuCOBOL testing, these programs would need IMS calls stubbed out or replaced with flat-file equivalents.
3. **ASREA003 must be pre-compiled:** The dynamic subprogram ASREA003 must be compiled as a shared library (`.dylib` on macOS, `.so` on Linux, `.dll` on Windows) before any program that calls it can execute.
4. **Many programs are alternatives:** ASREA740 and ASREA741 appear to be variants of the same frozen valuation logic. ASHMA850 and ASHMA857 are variants (IMS vs. sequential output). Not all programs necessarily run in the same job stream.
5. **Parameter/control cards:** Many programs read control cards (UT-S-PARM, UT-S-CARD, UT-S-CNTRLFLE, UT-S-CONTCARD) that provide runtime parameters such as tax year, processing options, and township selection.